

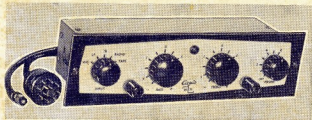
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AMATEUR RADIO

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

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 Melbourne, C.1.

EDITORIAL**"A LETTER TO THE AMATEURS OF AUSTRALIA"**

Dear Fellow Amateurs,

I desire to place on record through the medium of this journal that subsequent to the request from the Wireless Institute of Australia, the Postmaster-General, Mr. C. W. Davidson, M.H.R., confirmed in a letter under date of the 1st September, 1958, that provision will be made for the inclusion of a Representative of the W.I.A. in the Australian Delegation to the Administrative Radio Conference to be held in Geneva from August, 1959.

I have had the opportunity of personally thanking Mr. Davidson and have confirmed this in writing on behalf of the Federal Council of the Institute and all Australian Amateurs.

It is indicative of the regard in which the Amateur Service is held that Mr. Davidson has seen fit to include an Amateur Representative in the delegation in the capacity of adviser-observer.

The Australian Amateur has no ulterior motive in seeking representation at Geneva. This desire stems from the fact that the forthcoming International Telecommunications Union Conference is convened at a crucial time in the history of communications, and our frequency bands, of which we have sacrificed portion at every past Conference, stand in jeopardy.

As an internationally recognised Service distinct from national domestic services, we have a very keen interest in the problems of frequency allocation on an equitable engineering basis in relation to our own limited channels in which we have to operate alongside hundreds of other stations in a channel-density-per-kilocycle unworkable under the conditions required by our commercial "big brothers".

All over the world today the Amateur is presenting his case for the retention of his existing channels of operation through his Government Administration with the united hope that his national worth in defence, his ability in technical employment

in Government and private enterprise, his proven value in emergency communication operations, and his ability to contribute a valuable asset to the world of electronics generally, will be reason for his Government to consider his small requirements in the frequency spectrum sufficiently important to be safeguarded against encroaching commercialism.

There will be many Amateurs at Geneva as observer-advisers with the official Delegations from their countries, and we are particularly proud that, for the first time, a representative for the Australian Amateur will be officially accredited with the Australian Delegation in an advisory capacity when matters affecting the Amateur Service are under discussion.

I am aware that all Amateurs are desirous of knowing who is to be the representative of the W.I.A. at Geneva. Until such time as the financial position is secure, it is considered unfair to approach a person and request him to negotiate leave of absence for the period of the Conference. Rest assured that you will be informed when this position is reached.

The Federal Council takes this opportunity of thanking all those Amateurs who have so willingly contributed to the fund organised by the W.I.A. to raise the necessary finance. With the fund standing over £1,500 after deducting expenses for printing, postage, etc., assurance from our sister Dominion—New Zealand—that the New Zealand Amateur Radio Transmitters Association have opened a fund in support of the W.I.A. and the expectation of contributions from other Region III. countries, the prospect of reaching the target figure of £2,500 is most heartening.

In conclusion, I appeal to all those Amateurs who are financially able and who have not yet contributed to the Fund to expedite their subscriptions to enable the Fund to be closed at the earliest possible date.

G. MAXWELL HULL, VK3ZS,
 Federal President W.I.A.



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Transistorised I.F. Amplification

BY HANS J. ALBRECHT

THE application of transistors in i.f. strips requires some special consideration, particularly with regard to circuit economy. The selection of suitable types obviously cannot be done on lines known from valve technique, where practically any ordinary pentode is good enough for the purpose. It is well known that one of the important characteristics of transistors is their cut-off frequency beyond which they do not display amplification of any kind. On the other hand, costs of manufacture are often considerable for types with high cut-off frequencies. Thus it is a reasonable approach to choose transistor types according to the i.f. channels required. In addition, it may also be advisable to diverge from the channel frequencies generally utilised in tube technique, in order to make possible the use of transistors which are available at a lower price.

In consequence of what has just been outlined, a multi-conversion communication receiver with fully transistorised i.f. strips, could use about 10 Mc. as first i.f., if the highest receiving range extends to the v.h.f., and about two megacycles per second if 30 Mc. is the highest frequency to be received. The second i.f., normally 455 Kc. in orthodox tube receivers, should be retained in that range. A third i.f. strip may be tuned to a frequency between 50 and 100 Kc. Such an i.f. channel allows the use of a low-priced category of normal alloy-junction triodes.

As is well known, transistors in the triode class display their best frequency response in the common-base connection. However, this type of configuration may necessitate special consideration in the arrangement of the bias supply. For this and other reasons, the common-emitter circuit is generally preferred. Table 1 gives, for popular triode transistors, approximate information on the order of magnitude of the limiting frequency for i.f. amplification. The figures are largely based on theoretical considerations and experimental tests made by the author. They can only be regarded as average data. Individual transistors may possess cut-off frequencies up to at least 30 per cent. higher than the value given as average value for the type concerned.

The behaviour of triode transistors is similar to that of triode tubes inasmuch as there is a natural tendency towards oscillation, provided the stage

gain is high. An efficient remedy is a neutralisation circuit arranged in such a way that undesirable coupling between output and input circuits is compensated in a fashion similar to that known from tube technique.

Considering the requirements of a triple-conversion communication receiver it is intended to describe in this article circuit details of i.f. strips on about 2 Mc. and 455 Kc. with various types of transistors. A transistorised Qser or, in other words, a third i.f. strip on about 70 Kc. and appropriate audio output circuits shall soon be published within the framework of this series of the author's publications on transistorised communication receivers.

THE 2 Mc. I.F. STRIP

Depending upon the availability of modern transistors and their price, there are, presently, two popular categories of junction transistors for i.f. applications, namely the normal alloy-junction triode and the alloy-diffused-junction transistor. The use of the last mentioned type has obviously many advantages, because there is a considerable improvement of the characteristics governing the cut-off frequency. Assuming that, for this discussion, this type is represented by the recently developed OC170, its cut-off frequency in the optimum configuration is 70 Mc. On the other hand, the tendency towards excessive positive feedback through the internal capacitance is also reduced to a large extent. The interlead shield is normally connected to earth. Thus in cascaded tuned amplifiers or, in particular, in i.f. strips, this new junction transistor promises to be very useful indeed. In case transistors of this kind are not yet available on the Australian market, they should definitely be on their way to it.

Fig. 1 depicts the complete circuit diagram of an i.f. amplifier with two channels and the appropriate mixer stage. The first part of the figure illustrates an i.f. strip on 2 Mc. using two transistors of type OC170 in common-emitter connection. The correct impedance from stage to stage can be achieved by taps on either the inductance or the capacitance of the resonant circuits. To demonstrate how this can be done, the first resonant circuit is tapped on the inductance for correct matching to the mixer output impedance; in other words, this circuit represents the collector output circuit of the mixer which is not included in the circuit diagram. The capacitance of this circuit consists of two condensers in series with the centre being connected to the base of the first i.f. stage. The ratio of the two capacitances results in an impedance matching just as a tap on the coil.

For reasons of economy, certain triode transistors could also be considered for the 2 Mc. i.f. strip. The circuit would then take the form depicted in the second part of Fig. 1, which actually shows the second i.f. strip on 455 Kc. to be described further below. Again referring to Table 1, we are able to

select suitable transistor types at the desired circuit configuration. It can be found that, in common-emitter circuit, the OC44 permits i.f. amplification on 2 Mc., while with the common-base connection this type and the OC45 should result in satisfactory performance.

The resistances have been calculated to give a stability factor "S" corresponding to the requirements of tuned amplifiers, as already defined in the author's recent article in this journal. Thus $S = 2$, where "S" is given by the method described some time ago.¹ It may not be amiss to repeat here that

$$S = \frac{1 + \frac{R_b}{R_a} + \frac{R_b}{R_c}}{1 - a + \frac{R_b}{R_a} + \frac{R_b}{R_c}} \dots (1)$$

where the resistors are denoted as in the first stage of the figure, "a" being the current amplification factor in the common-base circuit. It should be recalled that "S" is defined by the derivative of the collector current to the zero collector current in common-base configuration. The stability factor thus depending upon the common-base characteristics is also valid for the common-emitter connection, because this definition of stability is not affected by changing from one configuration to the other. In other words, a stability factor derived from data in the common-emitter connection is related to our stability factor by a constant. To work towards standardisation of design methods for transistor circuit, it is advantageous to use only one sort of stability factor, namely that shown once again in the above formula. All comments to circuit stability in this series of publications refer to this stability factor.

THE I.F. MIXER

The two stages of the first i.f. strip are followed by a mixer with the output on 455 Kc. While an OC44 should be used in the actual mixer stage, the mixer oscillator may use an OC45. The oscillator circuit is very similar to that published some time ago in this journal.² Oscillator stabilisation is based on the author's method. With reference to one of his previous publications³ the value of "N", defined as the overall temperature coefficient of the oscillator frequency per degree Centigrade, is assumed to be 0.0025. This results in a variation of 0.62 Kc. per degree Centigrade at a frequency of 2455 Kc. According to formulae given in the publication just mentioned, we then find the necessary circuit coefficient as being approximately 0.5 parts in thousand. Taking into account the positive temperature coefficient of the coil, the method described before yields 600 negative TK units as the necessary temperature coefficient of the capacitance combination. This means that an ordinary ceramic condenser, having a temperature coefficient of a value between -700 and -800 TK units, should be connected in parallel

Type	Common Emitter	Common Base
OC44	2 Mc.	15 Mc.
OC45	1.5 Mc.	6 Mc.
OC70	50 Kc.	300 Kc.
OC71	40 Kc.	300 Kc.
OC72	45 Kc.	350 Kc.
OC73	80 Kc.	500 Kc.

Table 1.—Approximate values of cut-off frequencies.

to a capacitance with positive coefficient, e.g. a mica condenser. It is obvious that for accurate final adjustment of frequency an appropriate trimmer is required. Assuming a circuit inductance of 4 μ H. We find that, for 2.455 Mc., a total capacitance of 1,000 pF. in combination with a ceramic trimmer of about 30 pF. results in an oscillator on the correct frequency. This oscillator is coupled inductively to the mixer emitter by means of a link of a few turns on the oscillator coil, numbering about ten per cent. of the total number of turns required for 4 μ H. The coupling must be adjusted experimentally by varying the degree of coupling or by changing the number of turns of the link. The quiescent operating point of the mixer transistor OC44 is determined by the stabilising resistors, the emitter resistor being in series with the coupling link.

THE 455 Kc. I.F. STRIP

This part of the circuit uses two transistor triodes in common-emitter circuit and another one in the beat-frequency oscillator. According to Table 1, type OC45 is suitable for all three stages. Again, impedance matching is achieved by taps on one of the circuit components, in this case on the inductance. Here, as well as in the 2 Mc. strip, interstage coupling can be obtained inductively by h.f. transformers of the type normally used in transistorised equipment. In many cases, however, single resonant circuits with taps result in sufficiently good operation and are thus preferred because of simplicity of construction. Although division of the total winding into three parts for impedance match-

ing does not give optimum conditions, a good compromise can be obtained by this simple method. It is useful to use formers with adjustable cores. Alternatively, about 30 pF. of the circuit capacitance could be replaced by a trimmer to allow accurate and final adjustment to resonance on the required i.f. frequency. This is also valid for the coils utilised in the 2 Mc. strip described above.

As mentioned in the introductory remarks, a neutralising arrangement, consisting of capacitance and resistance or a capacitance only, may have to be connected from one transistor base to that of the preceding stage, if oscillation on the i.f. frequency is observed. Although the entire circuit is designed for considerable stage gain, neutralisation should normally not be necessary but this may depend upon battery conditions and other factors.

The b.f.o. is an ordinary oscillator variable around 455 Kc. The range of variation should be approximately plus and minus five kilocycles per second, giving a total of ten kilocycles. A trimmer of 30 pF. in parallel to the circuit capacitance of 330 pF. plus stray capacitance and that of the transistor yield the above mentioned range of variation, together with an inductance of 0.33 mH. Here we may assume a value of 0.00015 for N, thus requiring a temperature coefficient of -400 TK units for stabilisation by means of the condenser. This value is obtained by a combination with a condenser of positive coefficient, similar to the system used in the mixer oscillator.

The output is connected to a tap one third above the cold end of the coil and thus gives suitable matching to another mixer, in other words the first

stage of the Q5er to follow. Alternatively, this output may be connected to a detector stage.

GENERAL PERFORMANCE

Concluding this description of a part of the transistorised communication receiver, it is useful to consider its performance in relation to the receiver as a whole. As has been indicated previously, the low frequency i.f. strip and the audio part are soon to be described under the heading of a transistorised Q5er. The actual r.f. part, or the front end, of the receiver will also be dealt with in a separate article. The entire receiver is designed for absolute stability in all its sections. In order to allow a universal use of the receiver, all values are calculated for a six-volt supply. Four 1.5 volt dry cells in series or a six volt car battery can thus be utilised.

Of several possible methods of a.v.c. application in transistorised i.f. amplifiers, the following appears to be the best system, because circuit stability does not have to be jeopardised. Following rectification of the signal in the detector stage and appropriate amplification of the resulting d.c. signal, this is applied to a diode in parallel with one of the tuned circuits. Briefly, the amount of damping of this resonant circuit is then controlled by the strength of the signal. More details will be given later.

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- (1) Hans J. Albrecht, "Design Notes on Transistorised Audio Amplifiers," "A.R." Vol. 25, No. 1 (1957).
- (2) Hans J. Albrecht, "A Transistorised Miniature Transmitter," "A.R." Vol. 25, No. 3 (1957).
- (3) Hans J. Albrecht, "Notes on the Frequency Stabilisation of Transistor Oscillators," "A.R." Vol. 25, No. 3 (1957).

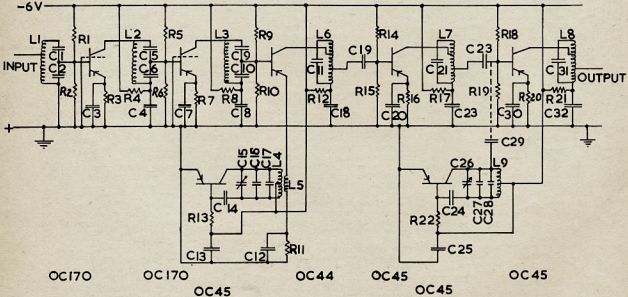


Fig. 1.—Transistorised I.F. Amplifier of Multi-Conversion Receiver.

- | | | |
|--|--|---|
| C1, C3, C9, C24—500 pF.
C2, C8, C10—2,800 pF.
C3, C4, C7, C8—10,000 pF.
C11, C21, C31—330 pF.
C12, C13, C18, C19, C20, C22, C23, C30, C32—30,000 pF.
C14—100 pF.
C15, C26—5-30 pF. trimmers.
C16—320 pF. (—750 TK). | C17—180 pF. (plus 80 TK mica)
C18—50,000 pF.
C19—200 pF. (—750 TK)
C20—130 pF. (plus 80 TK mica)
C29—Capacitance of two wires or fixed capacitor.
R1, R2—5,400 ohms, ½ watt.
R3, R12, R17, R21—1,000 ohms, ½ watt.
R3, R7—800 ohms, ½ watt. | R4, R8—150 ohms, ½ watt.
R9, R10, R14, R15, R18, R19—5,000 ohms, ½ watt.
R11, R16, R20—3,600 ohms, ½ watt.
R13, R22—100,000 ohms, ½ watt.
L1, L2, L3—15 microhenry.
L4—4 microhenry.
L5—See text.
L6, L7, L8, L9—350 microhenry. |
|--|--|---|

Frequencies for Emergency Net Working

BY J. A. GAZARD,* VK5JG

WHAT are the best frequencies for Emergency Networks working over short distances of up to 15 miles? Some Amateurs prefer the lowest frequencies available, those in the 3.5 Mc., but others claim that very high frequencies, such as 56 Mc., are best and give as examples the use by taxi and other mobile services of frequencies between 60 and 70 Mc.

Reference to text books gives no clear answer to the question but gives us the following relevant facts on radio propagation which will help to solve the problem.

Briefly, radio waves travel in four modes:

1. The Ground Wave—which travels along the surface of the earth and is vertically polarised.
2. The Space Wave—the direct wave which occurs when there are no obstructions between transmitter and receiver.
3. The Skywave which is reflected or refracted back from the ionosphere.
4. The Tropospheric and Ionospheric Scatter Wave.

The attenuation of the ground wave due to ground absorption increases rapidly with increase in frequency so that low frequencies are much better on the ground wave path. Over average country, it is unlikely that a 56 Mc. ground wave could be useful at more than five miles.

With the space wave, attenuation is due only to the wave spreading out with distance and therefore there is no difference between the propagation of the 3.5 Mc. and 56 Mc. signals.

Sky wave will occur only on rare occasions with 56 Mc. signals and even then 15 miles will almost certainly be inside the skip distance, but on 3.5 Mc. sky wave is effective although the waves are nearly vertical over short distances.

Tropospheric scatter wave can be neglected for the power and antennae commonly used in mobile working.

It would seem then that 3.5 Mc. is superior to 56 Mc. for ground wave and sky wave and equal on space wave. Other factors, however, must be taken into account. Taking first the space wave where attenuation is the same on both frequencies, we have to consider the antennae that can be used. As the space wave depends on a clear path between transmitter and receiver, the height of aerial is important and it is much easier to put the small 56 Mc. high up in the clear than the bulky 3.5 Mc. antenna of corresponding radiation efficiency. Also a 56 Mc. ground plane or beam antenna, which concentrates the signal in the horizontal plane, is easy to set up high but it is almost impossible to achieve the same results on 3.5 Mc.

Antennae suitable for 3.5 Mc. are the half wave horizontal and quarter wave grounded vertical which may be shortened by centre loading. The horizontal radiates an effective sky wave and

• The Publications Committee feels that the author has opened a most interesting subject and would be pleased to receive reports on experiences of those who have had experience with emergency networks. Reports of about 500 words, in a form suitable for publication, would be appreciated. —Editor.

space wave but does not produce a good ground wave as this is vertically polarised. On the other hand, a vertical antenna, while producing effective ground and space waves, does not give the near vertical sky wave required for short distances. Neither of these two antennae can be considered suitable for mobile working and if the vertical is shortened down to whip size, its radiation efficiency is lowered considerably.

Therefore if the country is such that space wave is possible between transmitter and receiver, then because of the greater effective height and the horizontal concentration that can easily be obtained on 56 Mc., this frequency will be most effective. On the other hand, if obstructions such as a range of hills intervenes between transmitter and receiver, sky wave is necessary and 3.5 Mc. with horizontal antennae will be most effective.

There are other factors which also will influence the choice. One of these is the strong atmospheric noise (static

that exists on 3.5 Mc. on occasions. It has been noticed that at times of heavy static a local 3.5 Mc. station is received better on a short untuned vertical wire than on a good high tuned half wave antenna. The reason for this would seem to be that the local signal is mostly space and ground wave while the static is sky wave. The horizontal antenna favours the static sky wave, while the vertical favours the signal ground wave, and thus the signal-to-noise ratio is better on the vertical antenna.

While these briefly are the theoretical considerations the best frequencies over any particular path can be determined only by actual test, but in testing all the above factors must be taken into account. For example, it is useless to compare both frequencies on one receiving antenna such as a six-foot whip.

One of the reasons why commercial mobiles use the 60-70 Mc. band is that as there are no long distance sky waves on these frequencies, the same frequencies can be used in different cities and States without causing interference.

Another band that might be considered for short distance emergency nets is 28-30 Mc. While 28 Mc. antennae are twice the size of those on 56 Mc., a quarter wave for whip or ground plane is still only eight feet long and there is a definite advantage in the simplification of gear. A 28 Mc. transmitter requires one less doubler than a 56 Mc. and most station receivers tune to the 28 Mc. band.

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AMATEUR TELEVISION

PART NINE

BY E. E. CORNELIUS,* VK6EC/T

TELEVISION TRANSMITTERS

Previous papers in this series have described specific equipment which has been tested and proved over a considerable period. In describing transmitters, the ground I will cover will be far less firm, and the discussion much more general.

A simple transmitter has been made up and performs satisfactorily. It needs a vestigial sideband filter to follow it, but I have had no success in designing such a filter for 300 Mc. that can be built and adjusted by an Amateur. The transmitter features are worthy of consideration, however, and while the transmission of the full lower sideband is out of band, and hence illegal, a discussion of the technique has point.

If a linear final amplifier is added to follow the transmitter stages in the vestigial sideband transmitter, the three tuned circuits on 295.2 Mc. may reduce the lower sideband adequately to comply with the regulations.

Thanks to the interest and help of John Stewart, VK1ZBS, who has suggested an alternative design with true v.s.b. characteristics, a transmitter for the 288-296 Mc. band is practicable for Amateur construction. This does not

* 157 Wood Street, Inglewood, Western Aus.

involve any more complex circuits than a t.v. receiver r.f. and i.f. section, and will be discussed later.

The design of a video transmitter is not simply a wideband version of an a.m. sound transmitter. Several new considerations, unique to television, call for a different approach. These are:

1. A wide bandwidth from 25 c.p.s. to 5 Mc., preclude all the more efficient methods of modulation.
2. The necessity for d.c. transmission, with an invariant black level requires special considerations in the modulator.
3. Vestigial sideband transmission (essential for 288-296 Mc.) calls for a rather unusual type of filter.
4. Video plus sound transmission requires two separate transmitters, but the subcarrier method can do this, and give worthwhile economy.

To consider the implications of wide bandwidth first, remembering that gain times bandwidth is more or less constant, it is important to realise that wherever the wide bandwidth is a factor, the power gain will be correspondingly low. This applies to the modulated stage, and to any linear stages which follow. An unsuspected trap is that even if the anode and/or screen is

modulated, the grid circuit must be wide band. Instantaneous grid current is a function of anode current, in a Class C stage, and if the anode current is varying at video rate, so will the grid current. To maintain adequate grid drive under all conditions of modulation, the grid circuit will therefore have to be wide band.

Happily, adequate circuit Q's at 200 Mc. are easy to obtain, in fact it is difficult to get the Q too high, but with undesired regeneration, this can occur.

Similarly, the antenna system must have adequate bandwidth, and for 5 Mc. video, multi-element Yagis have to be designed with care. In general, the greater the number of parasitic elements, the narrower the bandwidth. So for a specific antenna gain, it is better to have a number of driven elements, rather than the same gain from a parasitic array. The bandwidth of the transmitting antenna has to be of the order of the frequency transmitted, so any restriction in bandwidth at this point, is as serious as the same lack of bandwidth in the video chain.

To maintain both bandwidth and gain, therefore, it is necessary to have a high proportion of driven elements. In commercial practice, no parasitic elements are used.

A video modulator must run Class A. The bandwidth of 22 cps. to 5 Mc. makes the use of transformers and hence Class AB or Class B circuits, impossible. Anode modulation of a Class C stage is therefore out of the question except at very low power levels, due to the inherent inefficiency of the Class A amplifier. T.v. transmitters are therefore normally grid modulated, but at the power level of those to be described, anode and screen modulation has been possible.

A Simple Transmitter

The first transmitter to be described is essentially similar to any a.m. sound transmitter, excepting insofar as d.c. and video transmission modifies the modulator, and the special techniques applicable to 300 Mc. See Fig. 43.

As outlined in Part 1, the vision carrier is on 290.25 Mc. This is crystal controlled by a 10.75 Mc. crystal. A triet oscillator using a 6M5 (V1) triples

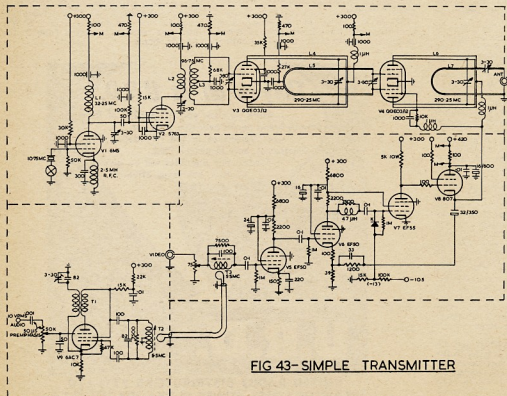


FIG 43-SIMPLE TRANSMITTER

in its anode circuit, providing 32.25 Mc. drive to V2, a 5763 tripler to 96.75 Mc. This in turn drives V3, a QQE03/12 tripling to carrier frequency of 290.25 Mc. A final QQE03/12 (V4) is anode and screen modulated by the video modulator.

Video from the camera chain at the 1.4 volt p.p. level is taken to an EF50 (V5) as a straight video amplifier and then to a feedback pair cathode follower V6, V7, V8, using EF50, EF55 and 807. This last is essentially similar to the feedback circuits in camera and camera control, and designed on similar lines.

The 807 cathode follower is directly coupled to the anode and screen feed of the final stage, and provides adequate modulation. The 807 cathode swings between +260 and +60 volts for maximum modulation. D.c. restoration at the grid of the EF55 maintains d.c. transmission with black level set at about 70% modulation.

The linearity on negative peaks (white) is poor, causing white compression, but could be overcome by using a negative supply for the EF55 cathode circuit, enabling the anode, and hence the 807 grid and cathode, and QQE03/12 anode and screen to be driven down to near earth potential on white peaks.

Sound Channel

To avoid the necessity for two separate transmitters for sound, a 5.5 Mc. f.m. subcarrier is injected into the video modulator, which generates a sound carrier 5.5 Mc. above (and below) the picture carrier. A v.s.b. filter, if it had been practicable, would have removed the unwanted sound carrier below the picture carrier. However, the principle of multiplexing the sound on the vision channel is equally practicable in the second transmitter to be described and will be discussed more fully in that context.

The transmitter, without filter, was tested on air, and provided a good signal over about three miles. Some 50 c.p.s. buzz was evident in the sound, due to d.c. restoration in the EF55 tending to clip the f.m. subcarrier on the sync. peaks. For anyone interested in a transmitter on these lines, coil details are as below:

- L1—9 turns 16 B. & S. on $\frac{3}{8}$ " diam., 1" long.
- L2—5 turns 16 B. & S. on $\frac{1}{4}$ " diam., $\frac{3}{8}$ " long, close coupled to—
- L3—6 turns 16 B. & S. on $\frac{1}{2}$ " diam., $\frac{3}{8}$ " long.
- L4—Lecher bars of $\frac{1}{4}$ " copper tubing at $\frac{1}{4}$ " centres, $3\frac{1}{2}$ " long, shorted with 10 B. & S. copper wire. 3-30 pF. Philips' trimmer $\frac{3}{8}$ " from short.
- L5—Lecher bars of shape shown in Fig. 43, at 1" centres, of $\frac{1}{4}$ " tube, $2\frac{3}{4}$ " long. 3-30 pF. trimmer on grids. Bars about $\frac{3}{8}$ " below L4.
- L6—as L4.
- L7—as L5, 2" long, with 3-30 pF. trimmer in series. About $\frac{3}{8}$ " below L6.
- T1—30 + 30 turns bifilar on $\frac{3}{8}$ " form, 40 B. & S. enamel.
- T2—20 turns 36 B. & S. on $\frac{1}{4}$ " former with slug. Link 2 turns over centre of winding.
- T3—as T2, link over cold end.

300 Mc. techniques apply to both transmitters and will be discussed in connection with the v.s.b. transmitter.

Sidechain Vestigial Sideband Transmitter

The block schematic in Fig. 44 will indicate the methods involved, in which the sideband shaping is done at a practicable frequency—29 Mc.—and this shaped response translated to carrier frequency.

The effective frequency multiplication in this case is 30 times, i.e. $3 \times (9 + 1)$, calling for a crystal on 9.675

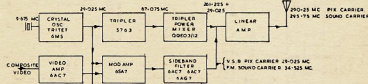


FIG. 44—V. S. B. TRANSMITTER

Mc. A tritot oscillator is used as before, a 6M5 tripling to 29.025 Mc. This signal is used for three purposes.

1. To two tripler stages as before, using 5763 and QQE03/12 with output on 261.225 Mc. (This frequency never actually appears—see later.)
2. To a modulated amplifier using a 6SA7 where the 29.025 Mc. subcarrier is modulated linearly with picture information.
3. To an f.m. subcarrier system for the sound channel, to be discussed later.

The modulated carrier from (2) is double sideband a.m., with a carrier frequency of 29.025 Mc. This is fed to a sideband filter using standard receiver type i.f. components to give a shaped response as shown in Fig. 45. This filter follows normal receiver techniques, and all tubes must operate Class A. The output of this is a standard v.s.b. signal, and is now translated in the modulated stage, by power mixing, with 261.225 Mc., to the carrier frequency of 290.25 Mc. The unwanted products of the mixer stage will be 29 and 58 Mc. below the wanted signal, and will effectively be rejected in following tuned circuits.

The Sound Channel

A two-stage audio amplifier lifts the microphone level sufficiently to enable a Miller tube modulator to frequency modulate an oscillator on 2.75 Mc. by ± 25 Kc., with good linearity. The oscillator doubles in its anode circuit to 5.5 Mc., with a deviation of ± 50 Kc., which is standard.

This 5.5 Mc. f.m. subcarrier is then mixed with the 29.025 Mc. sidechain signal to give an effective sound subcarrier at 34.525 Mc. This is re-injected into the main channel with the v.s.b. picture information, and is transmitted with it.

This method overcomes the sync. buzz effect noted in the first transmitter. Translation of the 5.5 Mc. to 34.525 Mc. enables injection back into

the transmitter, late in the chain, minimising v.s.b. amplifier overload and enabling the v.s.b. filter to cut off before 34.525 Mc., the sound carrier frequency.

It also reduces the probability of multiples of 5.5 Mc. appearing on each side of the main carrier, due to non-linearity in the video and v.s.b. circuits. See circuit, Fig. 46.

As this is being written to meet the Editor's deadline, this transmitter is not complete, but the main problems were attacked in order of importance, and proved soluble. These were:—

1. Power mixing at 290.25 Mc. This is feasible with useful efficiency, using a QQE03/12, grid or screen modulated. It is running with the circuit shown, with an output of about 0.7 watt from the modulated amplifier.
2. Linear video modulation of a 6SA7 is satisfactory with the circuit shown. Due to d.c. transmission requiring d.c. restoration at the 6SA7 grid, the screen voltage is stabilised by an OD3.
3. The v.s.b. side chain is quite practicable, as would be expected, but a fairly high modulation voltage is necessary, and the modulator tube is hence a power tube. The damping resistor constants shown are not final, and the pass band characteristic of the filter not yet ideal.
4. The 5.5 Mc. f.m. sound subcarrier generator is good as it stands, and the

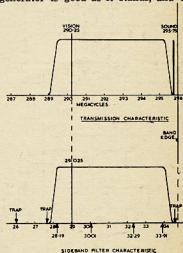


FIG. 45

centre frequency stability is more than good enough for Amateur operation. A discriminator circuit with a 5.5 Mc. crystal is quite simple, and will be incorporated in the future.

Power mixing at 300 Mc. is not an efficient process, particularly when the tube used, a 6QE03/12, is running above its commercial frequency limits. Using grid modulation of the final, the available output is about 0.5 watt. Screen modulation of the tripler stage frees the final stage(s) for linear amplification.

NOTE.—Fig. 46 shows an additional linear stage which should deliver 4-6 watts to the antenna feedline. This stage can be completely omitted with screen modulation of the tripler, but is necessary with grid modulation after the tripler.

As the final mixing is done at comparatively high level, it is worthwhile to consider the most efficient method possible. This is obviously plate and screen modulation, and now that the modulation band is 28 to 34 Mc., instead of 25 c.p.s. to 5 Mc., the use of a transformer is possible, and hence the use of a Class B modulator, single ended, or push-pull. A twin tetra-de like the 6QE03/12 should be ideal for this purpose, and will be tried in the near future.

In this system, the power mixer is effectively delivering a suppressed carrier single sideband signal, this signal being the new video and sound carriers, plus video and sound modulation components.

The suppressed carrier is, of course, on 261.225 Mc., and the unwanted sideband is the inverted t.v. channel generated between 233 and 226 Mc. These two products are effectively suppressed by the tuned circuits after modulation.

Assuming 60% realisable modulated stage conversion efficiency, with one sideband being one sixth of the total carrier plus sideband energy, the effective efficiency could not be more than 10%. But as the required sideband only is selected, the effective efficiency can be higher, up to 30%. With the 6QE03/12 it will be rather less than this, with its 200 Mc. commercial frequency limit.

I suggest using a 6QE02/5 as the final (linear) amplifier, as it has much higher efficiency at 300 Mc., and is capable of enough output to fully drive a 6QE06/40, which can give 40 watts or better at 300 Mc. This is real power, and with an attainable antenna gain of 14 to 15 db., an e.r.p. of 1 kw. can be obtained.

The Circuit

V1 and V2 in the exciter deliver power at 29.025 Mc. to the side chain circuits, and at 87.075 Mc. to the main amplifier. Coil data is shown in the table. V3, the modulated tripler, has its anode circuit tuned to 290.25 Mc., which can only be done with both grid and screen excitation. For tuning to the correct sum frequency, a good calibrated wavemeter is essential. Using Lecher bar tuned circuits as shown, it is easy to tune to the wrong harmonic or frequency. The range of a 3-30 pF. trimmer will tune to both the second and third harmonics of 87.075, and with modulation there are several sig-

nals which will give resonance, namely 174, 203, 232, 261 and the desired 290 Mc.

The post modulation circuits should be tuned with picture carrier applied, then, if possible, with only sound carrier applied (293.75 Mc.), and then detuned approximately half way between them, to 292.5 Mc., to give a symmetrical band pass for all wanted components.

The use of a calibrated wavemeter here cannot be overstressed, as it has been found that with the tripler anode, and final grid, tuned to 261 Mc., it is still possible to get the final to give good output on 174 Mc.

For those not familiar with Lecher bar tuning, if the bar inductance, and tube and stray capacitance resonate at a frequency higher than desired, a trimmer capacitor at any point on the bar will bring it toward resonance. If the tube capacitance and bar resonate at a frequency lower than that desired, a trimmer at the tube end will, of course, make it resonate even lower in frequency, but a trimmer near the shorted end will act as a moveable shorting bar and will raise the frequency of resonance. Not a true short of course, and with the trimmer more than about $\frac{1}{4}$ " from the shorted end it is possible to tune that part of the bar toward the tube to one frequency present at the anode, and also tune the part between trimmer and short, to another component. This can be very disconcerting, when there are components every 29 Mc. An absorption wavemeter has proved ideal for identifying the frequencies to which parts of the bar are tuned. A g.d.o. should be even better.

V.S.B. Side Chain

The vestigial sideband filter consists of a Butterworth stagger tuned quadrupole, around a centre frequency of 31.15 Mc. The bifilar circuits are tuned to 33.91, 28.19, 32.29 and 30.01 Mc. Traps at 34.7 and 27.76 Mc. are to provide the sharp cut-off required at the filter edges, and traps at 26 and 24 Mc. are to ensure that the unwanted sideband is suppressed 20 db. or better.

Using receiver type i.f. transformers, either commercial or home-made, as described in "R. & H." for October '57, the design and lining up is essentially the same. A minor difference is that the pass band shape is rather easier to handle than in a receiver. The band edge traps are sharply tuned, high Q, and the 24 and 26 Mc. traps much broader. They are distributed such that the trap slot is not near the centre frequency of the associated transformer, which tends to distort its curve during line-up. The last tuned circuit is selected for low Q to give some band pass in the sound carrier region and its trap well away from that frequency. The broad tuning of the anode circuit avoids the possibility of grid circuit overload, for components on its skirts. The bias of each stage is arranged to avoid grid overload, except in the 6AG7 modulator, which draws some grid current, necessary to obtain sufficient voltage to modulate the 6QE03/12 screen fully. The potentiometer in the 6AG7 cathode is for adjustment of optimum bias for maximum power output with minimum white compression.

The Sound Subcarrier Generator

The important requirement for this unit is its frequency stability. A Clapp oscillator circuit (V13) is used, with Miller tube reactance modulator (V12). As the percentage deviation is small, $\pm 1\%$, the oscillator tank can be reasonably high Q (low L/C ratio), and using silvered mica capacitors, the frequency drift is small enough to be neglected.

Doubling in the oscillator plate circuit helps to prevent interaction from the 5.5 Mc. and the 34.525 Mc. circuits from "pulling" the 2.750 Mc. oscillator circuit.

The heterodyne mixer V14 has two tuned circuits following it at 34.525 Mc. of high Q, to reject ride-through of the 5.5 Mc. carrier to the transmitter proper. Harmonics of 5.5 Mc. at 33.0 and 38.5 Mc. will also be rejected, so long as their amplitude is kept down by limiting the 5.5 Mc. drive to the grid of V14. Although not shown in Fig. 46, this is achieved by tapping down on L2 to a point where grid current does not flow.

The circuit shown, injecting 34.575 Mc. into the modulator cathode should provide adequate isolation of sound and video. The 250 ohm potentiometer in V1 cathode is to control sound carrier amplitude.

Metering

Adequate supervision of the r.f. power circuits is necessary. Grid and plate meters, switched to the points marked M enable lining up to be effected reasonably simply. All tubes except the optional V5 have no fixed or cathode bias and lack of drive for a short period can cause damage due to excessive screen or anode dissipation. Leave the anode or screen supply open until adequate drive is obtained to provide protective grid bias.

LINING UP

Use a calibrated signal generator, or wobulator, feeding direct to the outer grid of V7, with no video input, but fixed bias of -3 volts on the inner grid and a probe on the screen of V3. Line up the v.s.b. filter for optimum pass band. Detune the traps outside the bandpass while doing this. The damping resistor values are not final and will need to be varied to obtain optimum characteristics. Then tune the traps in T5 and T7 for band edge shaping, and then the other two for 20 db. rejection, or better, of the unwanted sideband. The wobulator or signal generator will need to cover 22 to 38 Mc.

Then apply 29.025 Mc. drive to V7 outer grid for ten volts grid leak bias on the outer grid and a 50 c.p.s. sine wave to the inner video grid, at about 10 volts p.p., or 1.4 volts p.p. to the video input jack.

A probe and c.r.o. on V3 screen will then show the demodulated envelope of the 29.025 Mc. carrier. Compression of white or black peaks will then be adjusted for minimum distortion. A probe check at the antenna terminal (into dummy load) should show the same condition. If not, the bias on the 290 Mc. Class B stage(s) must be adjusted.

The sound chain can be adjusted by injecting low level audio into the

(Continued on Page 11)

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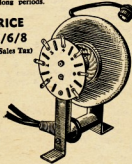
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PRICE £1/7/6

(Inc. Sales Tax)

MEET THE OTHER AMATEUR AND HIS STATION

RON FISHER* VK3OM

AMATEUR Radio Station VK3OM is located at Wheelers Hill, approximately fifteen miles south east of Melbourne. This is a very good radio location, being about 500 feet above sea level, and one acre of land is available for antennae.

The shack is part of the living room, so comfortable operating is assured all the year round.

On the front left of the desk is a completely self-contained 40 metre phone transmitter. This has mainly been used as a mobile rig, but also to keep on the air during re-building. It has an 807 p.a. with 15 watts input, and KT61s as modulators.

The main transmitter, to the rear of this, runs 130 watts input on all bands from 80 to 10 metres. A Geloso drives parallel 6146s in the final. A pi network output is used here. The modulator uses 807s in Class B with a direct coupled 12AU7 as a driver. Speech line-up is a Lorbor MD21 dynamic micro-

* Station: Fairview Avenue, Wheelers Hill; Postal: 758a Glenhuntly Rd., Glenhuntly, Vic.



phone to a 6AU6 pentode, 6AU6 triode and 6C4 driver. The r.f. and modulator units are together on the top deck, while the power supplies, control circuits and meters are on the bottom deck.

In the centre is a Heath Q multiplier which is used in conjunction with the receiver.

To the right is the Hallicrafters SX42 receiver. This has full coverage from

550 Kc. to 110 Mc. Used in conjunction with a crystal controlled converter for two metres, it gives full coverage of all the most used bands.

Three dipole antennae are being used at the present time, one for 80, one for 40 which also operates on 15, and one for 20 metres. A G4ZU beam is under construction.

Other hobbies are photography, both still and movie, and hi-fi reproduction.

CORRESPONDENCE

VS2DQ

Sungei Raya Estate,
Pulau Langkawi Islands,
Kedah, Malaya.
9th Sept., 1958.

Editor "A.R.," Dear Sir,

Would it please be possible for you to find space in your correspondence columns to let Australian Amateurs know the reason of the sudden disappearance of VS2DQ.

It was expected that I should next go on leave in 1959 and I had hoped it would be possible to visit your great Country. However, my leave has suddenly been put forward to this month and I have to go to England on business so I very much regret I will not have the opportunity of paying a personal call on some of the Australian Amateurs, perhaps it may be possible when the next leave comes.

Living in isolated location such as this, Amateur Radio is a real blessing and I have always particularly enjoyed the contacts with Australian stations. Over 500 VK stations have now been worked on phone and I am very grateful for the pleasant contacts, co-operation and encouragement I have been given.

All contacts should have been confirmed, but if QSL cards have gone astray then my address will be:—

J. C. Pershouse, GSKPY,
C/o. Westminster Bank Ltd.,
Town Hall Square,
Bexhill-on-Sea,
Sussex, England.

I expect to return to Malaya in March 1959 and look forward to re-newal of contacts with many Australian friends.

—J. C. Pershouse, VS2DQ.

AMATEUR TELEVISION

(Continued from Page 9)

microphone jack and monitoring the 5.5 Mc. output of L2 with a t.v. receiver discriminator. The final check will necessarily be "on air" with a t.v. receiver, using a converter, or one turret channel loaded with coils for 290 Mc. With the vision adjusted for optimum picture, reduce the receiver input till the picture is noisy. Then adjust sound carrier level till the receiver limiter is just beginning to lose control and noise is beginning to be evident. This gives optimum balance of the two signals.

V.H.F. TECHNIQUES

On 290 Mc. no liberties can be taken in layout, wiring, components, or bypassing. The circuit layout should be thoroughly designed on paper with a full scale sketch first. The chassis should be copper, brass or aluminium in that order. Wiring should be so short as to be practically invisible. Ceramic tube sockets are available from Philips for the double tetrodes and should be used. Bypass capacitors should be within 4" of the point to be bypassed and lead-through types used if possible, bead-type ceramics if not, use lead-through capacitors for metering points and keep the metering leads above chassis. Each tube filament

should be bypassed at the socket. A shield across the tube socket(s) of the linear stage(s) is an advantage, the pin connections lending themselves to this.

Stray capacitance should be very low. Note this. A capacitance of 5 pF. has a reactance of 120 ohms. To maintain 60 volts r.m.s. across this requires half an ampere of r.f. This happens to be the input capacitance, and drive requirements of the 6Q6E3/12, so you will see the magnitude of the problem.

For the side chain, orthodox t.v. receiver techniques and components are ideal as the frequency and circuits are closely parallel.

ANTENNAE

I do not propose to describe a specific antenna. I suggest that resonant parasitic elements be shunned, but otherwise, choose your favourite. My first was a folded dipole with bazooka in a corner reflector—gain 12 db. My next is to be a 16 element driven array with a screen reflector, a mattress. At this frequency antennae are easy to design and construct, and the standard text books will do far better than I.

And here I finish this series, with thanks for the dozens of letters I have had already, and hope for more to come. This introduction to full-scale Amateur Television has been lengthy but the field was wide. Now we need more specialised articles. Will you write them?

EARLY COPY

The closing date for copy for the January issue is 1st December.

W.I.A. FEDERAL PRESIDENT'S REPORT

It is my pleasure to present to you the annual report of Federal Executive for the period April 1957 to March 1958. There has been a steady progress on various matters during the year and of course included in this period was the 24th Annual Convention of the W.I.A. Turning to the matters of major importance during the period under review, these are as follows:

FEDERAL CONVENTION

The meeting of the 24th Annual Federal Convention during the period 19th to 22nd April, 1957, inclusive, and held in Melbourne was attended by thirteen delegates and members of Federal Executive. It was disappointing to all that the N.S.W. Division did not send a delegate as this was the first Convention held in three years and many important matters were discussed. I am very pleased to report, however, that, although not attending, the N.S.W. Council generously contributed to the Convention expenses. All Divisions have since this time received copies of the Convention minutes and I must apologise for the lateness of their arrival, which was due to the length of the proceedings and discussions. It was necessary to include much more of this matter than normal due to all Divisions not being present. In all, 32 Federal Policy items, 10 clauses of the Federal Constitution, 71 agenda items and 11 general business items were fully and completely discussed. The results of the ratification by Divisions of all items concerned have not to date been received therefore in most cases meaning that Federal Executive cannot take any action. This is unsatisfactory because there remains a great deal of work for the coming year which should have been partly completed by now.

I.T.U. CONFERENCE

As an outcome of a Convention item and on thorough consideration by Federal Executive, it was evident that with the I.T.U. conference scheduled to commence in July 1959 some form of action was being taken. The action taken by F.E. so that the W.I.A. would not have to take some action at the last minute.

After long discussions on the various aspects of this most important matter, your F.E. has now formulated a plan which has been notified to all Divisions and each and every Amateur should receive an individual notice of the scheme to send an Amateur Delegate to the Conference. All Divisions, realising the importance of the Conference, are already giving the plan their support, which I trust will continue until the necessary funds are raised.

MEMBERSHIP

Although full figures from all Divisions are not available, it appears that membership is increasing, but only slowly. It is evident that all Divisions must make increasing efforts to improve the membership by encouraging S.W.I. Groups to form and by making long-range plans that will not vary with each Incoming Council. By taking such steps and subsequently increasing interest in our hobby, the pool of available Amateurs for membership will automatically increase. All Divisions should endeavour to hold A.O.C.P. Classes which will also result in new members.

REGULATIONS

One of the major contributions to this aspect of Institute activities during the year has been the submission by F.E. to the P.M.G.'s Department of a revision of the Handbook for Operators of Amateur Stations. After consultation with the Department, F.E. were successful in all of their amendments being adopted and the new publication is understood to be at the printers at present.

Most of the anomalies of the previous edition have now been resolved, resulting in what is considered to be a much more understandable document, with little chance of misinterpretation.

During discussions on the Handbook, opportunity was taken to ask the Department for further privileges and this has resulted in the release of more realistic means of pulse modulation techniques. Other outstanding matters on which we hope to obtain some satisfaction in the near future are the use of the VK3 prefix and the novice licence. The requirements of the Federal Convention, of course,

have still to be submitted, when ratified, to the Department for a decision.

Our relations with the Department have been of the most cordial and whilst not always obtaining what we desire, the members of F.E. are always welcomed to discuss and present the requests of the Federal Council for consideration.

FINANCE

Due to the deliberations of the Convention, a more liberal allowance has been made by the Divisions to F.E. to conduct the Federal Policy of the Institute. The audited accounts and balance sheet of the Federal Executive are attached hereto as presented by the Federal Treasurer. You will notice that action has been taken, as a result of the Convention, to open separate accounts for the various funds as required. Whilst the monies in hand are still rather small, the additional income granted F.E. will be of great assistance in maintaining F.E. on a workable financial basis.

PUBLICATIONS OF THE INSTITUTE

The Publications Committee of the Victorian Division, who are entrusted with the publication of "Amateur Radio" and the Call Book, have again done an admirable job under difficult conditions as must always pertain when work is on a voluntary basis, with little thanks and plenty of criticism. The Federal Council agreed at the Convention to an increase in the price of "Amateur Radio" which has recently been implemented. It is hoped that this increase will allow the magazine to be published without becoming a severe drain on the Victorian Division's funds. Critics of the magazine will no doubt still find reason for complaint, but I seriously ask those in this category, "Are they doing anything themselves to help? Do they send in articles for publication—are they in a position to solicit advertising material—could they produce better circuit diagrams?" If they can answer yes to these three simple questions, I suggest they place their services at the disposal of the Publications Committee who will be elated. Your Executive not being complacent in this matter, have endeavoured to crystallise a few ideas and at the appropriate time will present them for your comment.

The Call Book has maintained its original objectives whilst including new features and I thank all Divisions for the support they have

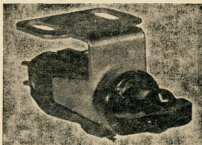
THE "MACRON" CRYSTAL TURNOVER PLAYER CARTRIDGE TYPE H.F.11

Made in Australia to suit Australian conditions

by MACRON ELECTRONICS PROPRIETARY LIMITED, 54 High Street, Glen Iris, Victoria

LET US LOOK AT THE FACTS:

- ★ Clip-in insert. Can be replaced without removal of mounting bracket.
- ★ Half inch and centre mounting interchangeable with standard arms.
- ★ Robust construction with positive positioning for "Standard" and "Longplay" positions.
- ★ Non-hygroscopic adhesives used throughout in the manufacture of the crystal element.



- ★ Slip-in Sapphire styli, interchangeable with standard makes.
- ★ Replacement styli available, also fit other standard cartridges.
- ★ High compliance, which ensures good tracking, thus resulting in low record wear.
- ★ Wide frequency response, enabling the utmost realism from modern wide-range recordings.
- ★ Attractively and safely packed in sealed clear-plastic container.

AGENTS: D. K. NORTHOVER
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NEIL MULLER LTD.
8 Arthur Street, UNLEY, S.A.

JACOBY, MITCHELL & CO. PTY. LTD.
469 Kent Street, SYDNEY, N.S.W.

Marketed by ZEPHYR PRODUCTS PTY. LTD., 58 HIGH STREET, GLEN IRIS, S.E.6, VICTORIA

given, which has resulted in a yearly profit for this publication being maintained. I trust it will continue in this vein in the future, again to our credit.

The magazine is the means of keeping our Federal structure—I ask all Councils to contribute in every way possible to its progress and improvement.

OVERSEAS SOCIETIES

As with I.A.R.U., we have maintained contact with the I.A.R.U., the R.S.G.B., the A.R.R.L., the V.Z.A.R.T. and other overseas Amateur Societies by radio and correspondence during the year and will also be able to obtain personal contact with the Federal Secretary, Mr. Douglas Bowie, who is at present on an overseas trip. In this way, we hope to be able to personally represent the W.I.A. and its official policy to societies who previously knew us by correspondence only. Mr. Bowie will be attending a Region I Conference in Germany later this year to discuss the forthcoming I.T.U. Conference and will undoubtedly be able to achieve much more this way than all the correspondence could do.

As mentioned in my last Annual Report, we made approaches to the Philippine Government through the Minister for External Affairs to allow their Amateurs to conduct contacts with VK Amateurs. I am very pleased to inform you that in this matter we have been successful and can now legally communicate with them. Once again Amateur Radio has demonstrated how international are its boundaries within which friendship and amity are a symbol of goodwill.

CIVIL DEFENCE EMERGENCY NETWORK

This network has now been re-named the Wireless Institute Civil Emergency Network (W.I.C.E.N.) and the Federal Co-ordinator, Mr. George Glover, has devoted a great deal of time and enthusiasm to its establishment and maintenance. Authorization cards for members of W.I.C.E.N. are now being printed, and firm rules and regulations for its operation have been promulgated. The promotion of this network is all important to the Institute for it may well be our "raison d'être" in international affairs. Its importance can therefore be not too strongly stressed, and all Divisions should continue to promote and support interest in it.

CONTESTS AND CERTIFICATES

The Contest Committee has once again continued their activities with zeal and have endeavoured to promote continued interest in all contests run by the Federal Executive. A set of rules under which they operate have been circulated, and the main task still outstanding is to provide an equitable scoring method for the selection of the Remembrance Day Contest winners. The Federal Executive themselves have taken an interest in this matter, and various statistics of past contests will soon be compiled for issue to all Divisions for future suggestions to maintain increasing interest in this popular contest. My personal thanks are recorded for the efforts of the Contest Committee who I trust will continue in their capacity for yet another year of honorary service to the Institute.

MISCELLANEOUS MATTERS

With the support of members of the Federal Parliament, I have continued to press for relaxation of the sales tax on equipment sold for Amateur experimentation and use. As yet our representations have not borne fruit, but I trust in the near future a satisfactory decision in our favour will be made.

The news of the century, the successful launching of Russian and American satellites into orbit around the earth, found its usual echo in the pages of the magazine. The Radio Amateurs of the world well to the forefront in providing scientific information of value to the authorities. The W.I.A. was well to the fore in this regard and the Amateurs in VK can be well pleased about the job they did. A great deal of very satisfactory publicity was obtained, quite undesired, and brought the service of the Amateur before the community at large.

I was very pleased to be able to make personal contact with some of the Divisions during the year, and thank them for their attention and hospitality during my visit. The use of tape recordings, too, I feel, has been the means of making the members of P.E. less conscious of the time and know that means of contact will be continued by your incoming President.

Continued cordial relations have been conducted with the Service communication chiefs on whom we often look for support in our representations to the Authorities. The Police

Department and the D.C.A. Chiefs are also numbered among our supporters and it is particularly pleasing to have useful allies in these people who realise the worth and wealth of potential the Amateur represents.

I am sorry to report the loss of two of our F.E. members who have been forced to resign as a result of business. I refer to Bill Gronow (VK3WG) and Bill Falconer (VK3JWF) who have been great assets to F.E. with their wide and varied knowledge of Amateur and business affairs. I wish them both well and trust that an easing of business affairs will once again render their services available to P.E.

At this juncture I wish to record my personal thanks to Mr. Ray Jones as QSL Officer, Mr. Doug. Paine and latterly Mr. Reg Jepson as Traffic Officers, Mr. Gordon Weyman as Awards Officer, and to the members of the Contest Committee, each and every one having given of his time and energies in an honorary capacity to making my five years as President more tenable and satisfying. I wish them all the best and trust they will carry on the good work for many more years in the same unselfish manner.

To all Divisional Federal Councillors and Councils, I also record my grateful thanks and know they will support the incoming President with the same wealth of advice and knowledge I have been accorded. To the members of Federal Executive who have given me their loyal support in my terms of office, no simple words of thanks can express my appreciation. I can only say in conclusion that the Federal Executive are a team and as such are only as strong as their weakest member. To the team were premiers—I hope they have been to you as well.

WILLIAM T. S. MITCHELL,
Federal President, W.I.A.

TREASURER'S REPORT

I have pleasure in presenting for your inspection the Financial Statements of your Executive for the year ended 28th February, 1958.

Your attention will be drawn to the surplus of income over expenditure contributed to

Accumulated Funds for the current year. This has been mainly brought about by the increase of per capita monies from 1/6 to 2/- per member, as authorised at the 1957 Convention.

The item "Convention Fund" represents the surplus in this account from the last Convention. This will be refunded to the Divisions on a pro-rata basis prior to the next Federal Convention.

The "Trust Fund" is a fund raised in result of a donation received and in anticipation of more to come, and will be utilised as thought best by your Executive.

Debtors: This figure of £245/19/11 is almost solely represented by per capita monies from the Divisions outstanding at date of balance.

Stocks on hand have been reduced considerably in the intervening twelve months. This is mainly brought about by the directive of the 1957 Convention, requiring certificate stocks to be written off and in place thereof the asset "Equipment—VK3JWF" to be raised. This is represented by equipment purchased ex Disposals, also gifts of equipment from Members, which, although obtained with little outlay, is, in its present complete form, more equitably represented by the figure shown on the balance sheet at £76/10/-.

I would like to take this opportunity in thanking yourselves, also the members of the Federal Executive in their co-operation during the fiscal year just elapsed which has facilitated the presenting of these accounts.

G. G. EWIN,
Federal Treasurer, W.I.A.

EARLY COPY

The closing date for copy for the January issue is 1st December.

WIRELESS INSTITUTE OF AUSTRALIA—FEDERAL EXECUTIVE

BALANCE SHEET AS AT 28th FEBRUARY, 1958

Current Liabilities:					
Creditors	.....	£21	3	7	
Convention Fund	.....	£43	15	3	
Trust Fund	.....	5	5	0	
Accumulated Funds:		49	0	3	
Balance, 1/8/57	.....	£474	16	3	
Surplus for year ended 28/2/58	.....	112	7	6	
		587	3	9	
		£587	7	7	
Current Assets:					
Cash on hand	.....	£8	0	0	
Commonwealth Savings Bank (Society A/c)	.....	215	12	8	
Debtors	.....	245	19	11	
Stocks on hand	.....	25	0	0	
Prepayments	.....	3	16	0	
		£498	9	7	
Fixed Assets (at cost less depreciation):					
Filing Cabinet	.....	£14	0	0	
Typewriter (No. 1)	.....	34	0	0	
Trophy—Ross Hull	.....	27	8	0	
Trophy—Remembrance Day	.....	7	0	0	
Equipment—VK3JWF	.....	76	10	0	
		153	18	0	
		£587	7	7	

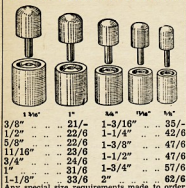
INCOME AND EXPENDITURE ACCOUNT FOR YEAR ENDED 28th FEBRUARY, 1958

EXPENDITURE		INCOME	
To Audit Fees	£110 0 0	By Per Capita Payments	£239 18 0
„ Badges	4 0 0	„ Sale of Badges, Log Sheets and Sundries	9 17 0
„ Bank Charges	17 3		
„ Depreciation	29 3		
„ Entertainment	29 0 0		
„ Federal Contest Committee Expenses	15 1 8		
„ Log Sheets	6 0 0		
„ Postage and Telephone	20 17 5		
„ Printing and Stationery	16 4 2		
„ QSL Bureau Expenses	8 17 2		
„ Sundries	3 9 0		
„ Trophy Expenses	2 5 7		
„ Profit to Accumulated Funds	112 7 6		
	£240 15 0		£240 15 0

We have examined the books and vouchers of the Wireless Institute of Australia (Federal Executive). In our opinion, the Balance Sheet is properly drawn up to exhibit a true and correct view of the state of the Federal Executive's Affairs as at 28th February, 1958, and the attached Income and Expenditure Account is properly drawn up to exhibit a true and correct view of the results for the year ended 28th February, 1958, according to the best of our knowledge and the explanations given to us, and as shown by the books. Stock on hand at 28th February, 1958, has been accepted on the certificate of the Secretary.

DAVID FELL & CO., Chartered Accountants (Aust.), 12th August, 1958.

"WILLIS" CHASSIS PUNCHES



Any special size requirements made to order

Q-MAX SCREW-TYPE CHASSIS CUTTERS

5/8"	26/7	1-3/8"	38/6
3/4"	26/7	1-1/2"	38/6
7/8"	29/4	1-3/4"	42/-
1"	34/10	2-3/32"	68/9
1-1/8"	34/10	2-1/2"	81/7
1-1/4"	34/10	1" Square	52/8

One key supplied with each cutter.

Spare keys 1/8 each.



LIST No P 340

MAINS CONNECTORS

Bolgin Type 273, similar to illustration. Flash 3-Pin Plug and Socket. Ideal for any equipment. 7/8 each.

PI-COUPLER FOR HIGHER POWER

Compact, handswitched, high power pi-coupler inductor for co-ax output. Rated for 1 max. 1200w. d.c. at 900 mA. Input. Higher voltages on c.w. and s.a.b. For max. efficiency the 10-metre coil is made of 1 in. silver-plated strip, 15 and 20-metre coils of 1/8 in. silver-plated wire, and the 40 and 80-metre coils of 12 B. & S. tinned-copper wire.

Input capacity 250 pF. max., output capacity 1,800 pF. max. A single pole five-position switch is provided which can be used for switching in parallel capacities when required.

Recommended input capacitor: Eddystone Type 817. Recommended output capacitor: Standard miniature 3-gang 5C condenser which is suitable in this position up to 1 kw.

Price: £4/17/6 nett

GELOSO PI-COUPLER

Another winner for the Amateur. The answer to TVI and antenna matching. Will match any impedance from 40 to 1,000 ohms over 80 to 100 metre Amateur bands.

Price (inc. tax): 31/6

SPECIAL HI-POWER PI-COUPLER CHOKE

150 watts, 25/-

WILLIAM WILLIS & CO. PTY. LTD.

The House of Quality Products
428 BOURKE ST., MELB'NE
Phone: MU 2426

I.T.U. FUND DONATIONS

Listed below are additional contributions to the above Fund to send a delegate to Geneva for the I.T.U. Conference in 1959. The editorial in this issue of the magazine should be read by all members—it should give you some idea of the reasons for sending a delegate to the Conference and may further encourage contributions from those who have so far forgotten to forward their £1.

Please send your donations in cheque, money order or postal note to:

Federal Secretary,
Box 2611W, G.P.O.,
Melbourne, C.I. Vic.

The following list is current to the 30th September, 1958:—

£10/10/0
W.I.A. Victorian Division, VK3W.

£5/5/0
L. W. Louttit, VS8BE; W.I.A. West Australian Division, VK6WL.

£4/4/0
M. H. Meyers, VK2VN.

£2/2/0
R. C. Meadows, VK2IN; A. E. Barlow, VK-2Q; N. C. Seymour, VK2X; C. C. Eakins, VK6CH; R. H. Atkinson, VK6WZ; G. Clarke, N.S.W.; R. H. Kyle, N.S.W.

£2/0/0
W. H. Barber, VK6DX.

£1/10/0
D. F. Lloyd, VK2AO; A. R. J. Topp, VK-2AXT; T. R. Cuttle, VK4ZAT; R. Elms, VK6BE; T. Mills, N.S.W.

£1/1/0
J. W. A. Paton, VK2VQ; A. R. Herald, VK-3AJ; A. L. Berry-Porter, VK6R; J. Allan, VK5UL; P. C. Lambert, VK6FL; H. O. Hawke, VK6CH; H. D. Spence, VK7DM; N. C. Bell, N.S.W.; W. L. Grimshaw, N.S.W.; L. E. Hawke, N.S.W.

£1/0/0
L. Sparke, VK2ACR; J. Redman, VK2JE; S. Steinwald, VK2KC; E. Phillips, VK2ZDF; I. Agar, VK2AIM; M. Norman, VK2ZMN; J. Weaver, VK2AJ; R. Huband, VK2RV; A. Griffiths, VK2ZDG; A. Springett, VK2OM; R. Roberts, N.S.W.; E. Spaulle, N.S.W.; A. Walker, N.S.W.

N. W. Sievers, VK3ACB; C. Luckman, VK3ADL; K. Burnett, VK3AKV; L. Wright, VK3ALT; Mrs. M. Stafford, VK3KS; I. Stafford, VK3XB; J. Kling, VK3AJ; G. McFarlane, VK3AYM; J. Goodall, VK3ZEG; C. McNally, VK3CE; A. Harris, VK3CH; D. Glider, VK3AHG; D. McDonald, VK3DM; H. Fleming, VK3HP; E. Cameron, VK3MB; Colley, VK3ZG; G. Weynton, VK3XU; J. McClellan, Vic.

O. Alder, VK4JB; M. Power, VK4FM; R. Conway, VK4ZAY; S. Baxter, VK4FJ; J. Files, VK4F; F. Parker, VK4F; J. Bull, VK4FR.

H. Lloyd, VK5BC; F. Eastick, VK5AE (Northern Territory); L. McGrath, VK5GJ; J. Watts, VK5OM.

A. Lathwell, VK6AL; W. Moore, VK6BA; R. Everingham, VK6BO; B. Field, VK6BR; C. Farke, VK6CF; S. Cooke, VK6CI; E. Hodgson, VK6H; E. Cowles, VK6J; G. Malcom, VK6GJ; J. Cook, VK6JA; J. Godley, VK6JG; R. Westbrook, VK6KO; L. Allen, VK6LA; L. Morrison, VK6LM; A. Austin, VK6MA; M. Murray, VK6MY; N. Odgers, VK6NF; R. Peterson, VK6PV; B. Sorley, VK6RO; R. Stiffold, VK6S; W. G. McKee, VK6W; L. McGhee, VK6WL; W. Morris, VK6WM; W. Morris, VK6WW; F. Whitfield, VK6XF; C. Sirl, VK6XG; R. Crowell, VK6BX; A. Sowden, ex-VK6SN; I. Stimson, W.A.

J. Milne, VK7AG; G. D'Emden, Tas.; J. Lee, Tas.

Under £1/0/0
M. McGarrigue, VK2YG (10/-); B. Congdon, VK6BC (10/0); F. Paget, VK6ZBF (3/-); M. McGinnis, VK7MF (10/-); B. Heybrock, N.S.W. (10/-); L. Walter, N.S.W. (10/-); D. Hosken, Vic. (10/-); S.W.I. Group, W.A. (18/-).

Amendment to October List

Amend J. Mackie, VK2ZM, to read J. E. Mackie, VK2ZDM. Amend J. Hayward, VK2, to read J. Hayward, Vic. (4/-).

The progressive total to the 30th September, 1958, is £1,652/0/9.

PREDICTION CHART, NOV. '58

	E. AUSTRALIA — W. EUROPE S.R. Me.												Me.	
0	2	4	6	8	10	12	14	16	18	20	22	24		
45	GMT													45
28														28
21														21
14														14
7														7
E. AUSTRALIA — W. EUROPE L.R.														
0	2	4	6	8	10	12	14	16	18	20	22	24		
45														45
28														28
21														21
14														14
7														7
E. AUSTRALIA — MEDITERRANEAN														
0	2	4	6	8	10	12	14	16	18	20	22	24		
45														45
28														28
21														21
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PEOPLE WHO KNOW ...

THE PILOT

Ever since Icarus made the first attempt at flight, man has turned his eyes towards the heavens.

Today the sounds of man-made flight are a commonplace thing, and with ever increasing air power has come ever increasing responsibility to the thousands of passengers and air crew members who travel the airways daily.

The responsibility for maintaining strict air schedules and maximum safety during arrivals and departure at the various air terminals throughout the world, is largely handled by means of radio. Without radio many of the safety devices used daily at these air terminals would not exist.

Radio plays a major part in today's air travel, and the Australian valve most used in air to ground communication, is, of course, Radiotron.



RADIOTRON 5786

*Used in Aviation
Distance Measuring Equipment.*

Manufactured by

AMALGAMATED WIRELESS VALVE CO. PTY. LTD.



VCE-38

H F

Why some nice DX pulled out of the sky the more important being the ZS6 by VK6BE—no details to speaking of KH8 by VK4 and VK9, and of DUILW and others in VK5. And consistently by VK4, 6, 9 and 2. VK6 enjoyed almost daily commercials VOSK and Radio City to S9 plus, Oct. 2 found the start of the day, F2 signals followed the evening around 1945 W.A.S.T. opening VK2-4 and 6 were all there. One opening prior to this ran for small hours, commencing around 0130 about 0130. Who went out, the VK6s from tiredness?

first hearing of JA4HM, S8 on
S, heard by JAZY, the VK3 gang
until Oct. 8 when J. Nig-
009, who was there shortly
past, sounding like near local
they were still belting in. Sev-
sons made them first JA
more than the common loca-
t, but had no luck with their
the QRM. Russ BCK was on the
suggested the gang
signals around 7 a.m.
Russ hearing JA stations call-
ing the evening of Sat. Sept. 13,
there are no more JA's
evening of Sat., Sept. 13, also
listening to 7ZAJ, but he could
nudge it, tx being inoperative,
and a fairly good DX station
DX sig. whilst beaming north,
remained unidentified because of
frequencies. Several excellent Auro-
ra DX stations were heard from
applies to the south.

report that the response to the log returns was good is incorrect. Approx. 20 per cent. of the known stock during the year. Logs being sent to the following:

VKX 2WH, 2ARG, 3ZDG, 3ZAE, 3ZAL, 3ZAZ, 3ZAT, 3ZBP, 3AHL, 3AKG, 3ANZ, 4ZGL, 6ZAX, 6ZBP, 8KX, 9NZT. The log of Hughes Aircraft Co., Melbourne, Australia, has been received. They do not have. Buck up, fellows. do not get angry. Something is being done at present. Not by those who initially accepted responsibility. If you are interested. It is important that your name be put down for the next frequency allocation of 50-54 Mc/sec. If you are part of a group, must fight 100 per cent. If you are not, let us go down fighting. We have had 3ZDG have been sent in and in the near future notify 3ZDG so that he may

Z sends some interesting com-
SK and Radio Peking.—3OF.

Voice of South Korea, near-
casts news in English at 1815 hrs.
has been heard on the following
9.5, 46.25, and 44.6 Mc. We are
sure that these are spurious radia-
tion from the station operating on 11.9 Mc.
The frequency relationship of 11.9
to 49 Mc. is a.m. beat, parasitic
would produce f.m. If it is an
fundamental his deviation on mod-
varies a lot, at times he is almost
others he is about 150 Kc. is wide
out to the assumption that it is a
to be a beat, but it is not. I want
to get any better copy off a
m. receiver that I borrowed for
of checking. I think that he uses
a system of modulation known as
and-frequency shift-variable am-
intelligent-frequency modulation".

ng.—About 45 Mc. would be a
for the 3rd harmonic of the 15
lined to favour the 3rd harmonic
ct a.m. on this signal. Raw car-
Mc. Seems to originate in Asia
Then very strong, he has little
at 100 Kc. apart for a half mega-
each side of 49.8 Mc. Teletypes
the stuff comes from between 43
is anybody's guess. Teletypes
mod., freq. shift keying, anything
times.—424Z.

A lot of v.h.f. operators may be wondering what is being done in the fight to keep the 50 Mc. band.

At the present time the VKS V.h.f. Group is drafting an application for an extension of 50 Mc. occupancy to cover the year of International Geophysical Co-operation, i.e. next year. The principal arguments to be submitted are (1) The valuable contributions a number of VKs are making to F.R.P.; (2) 50 Mc. is unlikely to be used for i.v. for some time yet.

With reference to (1) a word of explanation is in order. P.R.P. (Propagation Research Project) is run by the Director of the Water Resources Center, the director is Mason P. Southworth, WVLN. P.R.P. requires as many DX reports as it can get. DX reports are not represented. You can join this worthwhile project by sending a copy of your report to the Director of the Water Resources Center, Search Project, 330 Siles Deane Highway, Connecticut, U.S.A. In return you are forwarded copies of the reports of other DXers. Mc. DX news, also the official reporting forms which you fill in for your report. In order to justify our interest in you, we must know that you will realize that VK should be well represented in P.R.P. VK is the only country in the world to report on the water resources.

The response to F.E.'s call for logs has been poor. So poor that this Group has been obliged to send out a letter to all defaulters. Please treat this letter as in the right spirit. Remember, without your log, no case for permanent retention of 50 Mc. as a band can be developed.

—VK3ALZ, for the VK3 V.h.f. Group.

This month we are pleased to report that the signal of Dave 2AWZ is now back on the air. It is hoped that you will soon be racing around in the little red car again Dave.

As expected, the lecture on and demonstration of oscilloscopes, given by Bob 2QZ, on 1 Sept. was an outstanding success. Bob brought along various types of "home-brew" scopes and those who attended left the meeting with a good deal more knowledge than they had before attending.

In VK2 we have been for some months developing a converter which has now been made available to members in a kit set form with complete detailed instructions for construction. The converter uses a 6BQ7A, a L3 and a 12AT7 and has a noise figure of which is very satisfactory. The converter minus crystal has been made available in the kit set form at its cost of £6.

The monthly Mobile Fox Hunt in which John 2NF assisted by Bob 2QZ was fox turned out to be the usual exciting evening. There was a good attendance of hounds, the fox being first caught by Jim 2PM assisted by Phil 2R, then Ron 2ZBG assisted by Alan 2RX (three times), and Bob 2OA, driven by John 2AV, once. When the fox went to ground, it was located first by Jim 2PM who dead-ended for first on the night's activities with Ron 2ZBG with Winchie 2OA in second place.

Your scribe for the past two months now
 goes out and you can expect a big improve-
 ment in next month's notes which will be
 written by Dave 2AWZ.

5 Metres.—Local activity for this time of the year is very good and there is usually one or two stations monitoring the band at most times. Perseverance had its just reward on the morning of Sunday, 5th Oct., when the first DX break-through for quite a few months occurred and Melbourne stations worked JA stations at 89 for the best part of an hour.

quite a bit of the discussion about the band. The members moves for the retention of 6 metres over the New Year and Jock 3ZDG and Iain 3ZLZ have been burning the midnight oil in an effort to present a watertight case to present to F.E. As a result of all this work, the V.h.f. Group held an extraordinary meeting on Sat., 28th Sept., and a lengthy set of arguments was listed in favour of retention of the band. This list was read at the general meeting for October and a copy was forwarded to the Federal Councillor for VK3. Copies are

also being sent to all other interested parties,
both in and out of VK.

Nineteen stations participated in the Sept. scramble, a record number to date, which was won by Jock 3ZDG with 17 contacts.

Field Day.—The first of the v.h.f. field days for 1968-69 is scheduled for November, although the date has not yet been decided on. This should be finalised at the October v.h.f. meeting and will be published on the 3WI broadcast. Rules for the coming field day season appeared in Sept. "A.R."

2 Metres.—The winners of the first two metre scramble were 3ZEO and 3ZFA, one disappointing feature of the scramble was the lack of out-of-town activity and it is to be hoped that the scramble will not remain a Melbourne only affair. These scrambles are held from 1945-2015 hrs. on the second Sunday of each month, so dust the cobwebs off that 2 metre gear and be in the next.

V.h.f. Meeting.—The Sept. meeting consisted of a demonstration of noise figure comparison by John using a silicon diode noise generator by John and ZAI, and a demonstration of aluminum nitride soldering by Bob SZAN. Bob used one of the new type self contained portable gas cylinder and blow torch and discussed the advantages of this method to make joints and defied the efforts of the group to break them. Bob brought along with a P.M.G. Research Laboratory report which showed that in general the joints formed have very good electrical properties and are at least as strong as the joint metal. Using these soldering methods, Bob made a very strong aluminum nitride joints which were made from dural tube and some nuts and bolts. —ZAI.

DX? DX? Plenty of the stuff, lots and lots of JA stations, a few KH6 and a lonely VK9. All the gang had their share, the newer boys on the band being most popular. New VK calls heard on 50 Mc. in Brisbane are 4ZBY, 4ZBI, and 4BN. 4HD still working all and sundry from the heights of Mt. Buderin. Nice signal Max. The VK4 gang did not hear anything of 3AHJ on the date he said he would be in Brisbane. The VK4 gang did not hear anything of 3AHJ on the date he said he would be in Brisbane. The VK4 gang did not hear anything of 3AHJ on the date he said he would be in Brisbane.

No. 545, during the month of Sept. Card stated first \$30 Mc. holder from overseas country. Also advised 4ZAZ claim received. 4NG ran into a heap of bad luck, his application sent early this year got LOST between Aust. and Japan. Bob's second application is on the way now. He now has all his QSLs for W.A.J.A. Award, also received his \$30 Award from Sugimami Radio Club. Said there is no English on it.

Douglas 42CA is putting a signal on 50 Mc. soon, QTH west of Rockhampton. 42BF/42AZ have been fixed mobile Mt. Coot-tha, said it is a good spot for DX, no noise, only signals. Did you blast all the other cars away Allan? Bruce 42BD at new QTH, Clontarf, working JAs off a dipole on the picture rail in the room. Nice work.

V.h.f. Group working hard to retain 50 Mc. for as long as possible, getting logs together, etc. Lance 3AHL was in town, contacted Jack 4JO re V.h.f. Group doings. 4NG and 4ZAZ heard in Brisbane, but did not hear the local gang calling them. We are all looking forward to working the VK gang again, getting tired of working JA. It will be great to be ear-

Very few v.h.f. enthusiasts operating on 288 Mc. at the moment. From this QTH only Bill 5WR and Brian 5ZGT have been heard and they were crossband to George 5ZGA on 50 Mc.

144 Mc. still revolves around contacts with Hughie 5BC; most contacts scheduled around 2000 hrs. when Hughie is available. Brian 5ZBX, George 5GB, Reg 5QR and Curl 5ZBL also on the band at odd times.

50 Mc.—Two new calls to this band, Lance 5ZBY on 51.01 using a four element yagi, and John 5ZCJ using a 2E26 in the final. John's rx at the moment is fairly broad, but hopes to have a selective rx shortly. Ken 5RP heard testing on the band with a dummy load, last heard Ken about 3 years ago. Keith 5MT still active but will shortly change QTHs and there will be purely mobile or fixed portable. Keith has been re-building all his rigs for mobile

Lance 5ZBC in regular contact with George 5ZGA and testing various microphones, also heard Gilbert 5GX with modulation troubles. A further newcomer to the band is Barry 5ZBZ working fixed portable and mobile using a 12AT7 overtone doubler to a 5763. Barry's YL became his XYL on Saturday 4th. Comments: old man. How lucky can you be? No

(Continued on Page 18)

still as keen as ever; 3A0M, have nothing specific of George this week; 3CX, who has completed his W1 marathon and sent the cards away for credit; 4D0, who is coming to Syd-
 ney to see what makes the VK2 boys tick; 4RW for some late information on the FKAS deal; 4XJ now finding 28 Mc. coming to his liking; 5RX went to the trouble of sending in material from 5RX and 5LD; keep them on the job, Ray. We would have had SWO in the list too, but skip took him out and brought VK3 and VK6 in instead at the critical time. VK3 is very interested in s.b. activities; 5RX still doing well on 50 Mc. and not using the h.f. bands so much. The s.w.'s, we have WIA-12061 keeping the VK2 S.w.I. Group on the ball, WIA-12022 with a total of 153 countries tucked away, BERS195 who raised some interest with receipt of VK3 for a night. I need one for VK3QL Eric. Ian Thomas who is now WIA-13065, but QRL studies, and Rod de Balfour who is happy with band conditions. Sept. We must not of course forget our overseas helpers, WARVX and 5M3C1. 73 and don't forget the earlier deadline.

VHF

(Continued from Page 16)

many XVLs would allow radio on a honeycomb, and I wonder just how many contacts you have in VK7 Barry. Two more of the fraternity are Interstate at the moment. Graham 5GGA mobile VK3 for a month, and Al 5ZCR portable VK3 for a night. I hope you work some of those JAs fellows. Incidentally, Al now has a 55 ft. high mast for his 4 element. Hugs and 5RG. I hope you work 50.5 Mc. using m.c.w. Haven't heard that station here, but believe it is using kilowatts. Only Ja reported here was heard by Ron 5MK on 5th at 9.15 am, the signal was in and out at 57 talking Jap. Reg 5QR has completed his table-topper for 50 Mc. using a Command to change the v.f.o. port and a 500 ohm inductor and the re-built with an 829B in the final with 15w. input and phase modulation. Reg apparently has b.c.i. problems. Rob 5RG in the land for VK9 where he hopes to become active on v.h.f. —ZAW.

AMATEUR TV.

The mention in the VK5 notes last month that one of the VK gang was interested in Amateur TV transmitting on 28 Mc. brought a quick response from Bill 3BU. It will be found out who it was he would like to drop him a line and the signal was in and out at 57 talking Jap. Reg 5QR has completed his table-topper for 50 Mc. using a Command to change the v.f.o. port and a 500 ohm inductor and the re-built with an 829B in the final with 15w. input and phase modulation. Reg apparently has b.c.i. problems. Rob 5RG in the land for VK9 where he hopes to become active on v.h.f. —ZAW.

RADIO OFFICER or RADIO TECHNICIAN

Gilbert & Ellise Islands Colony Government invite applications from men, preferably married, for the vacant post of Radio Officer or Radio Technician. Emoluments Salary in Scale EA 1151 to EA 1610, entry in scale dependent on qualifications and experience. Gratuity payable £A30 for service completed three months of service. Contract terms two years (renewable) with opportunity of permanent appointment. Fully furnished accommodation provided at a nominal rental. Leave, five days for each completed month of service. Qualifications: 1st or 2nd Class Commercial Operator's Certificate; minimum qualification, Broadcast Certificates with Morse 1st Class. Duties include maintenance h.f., v.h.f. communications and broadcast equipment, knowledge of marine radar installations advantageous. Apply giving details of age, experience, qualifications and whether married to the Agent. WEST. PACIFIC HIGH COMMISSION, Box No. 871K, G.P.O., Melbourne, Vic.



Ian J. Hunt, WIA-L3007
 211 St. George Road,
 Northcote, N.16, Vic.

This month we begin our notes by appealing for support for the magazine. If you have any Hints and Kinks, please forward them to the Editor.

Unfortunately I cannot include our feature S.w.I. of the Month in this issue as no one has provided me with the necessary information. How about some of the VK3 gang telling us their history?

QSL of the Month.—Only six cards were entered in this month's contest and Ian Hunt scraped home very narrowly in the voting with a card from UB5FG. A card submitted from UASKAE was a close second. Again I ask that other Groups participate in this section of our notes by ruling a contest of their own and advising us each month of the result. Whilst on the subject of cards, I might mention there is news in the DX section of P2ZAQ and ORAVN who may be well worth chasing. Now for our interstate news.

NEW SOUTH WALES

Don Grantley again keeps this State on the map. He has made many preparations for the VK-ZL Contest and so should come up with a good score. A holiday in Sydney will follow. He is contemplating a solution to the antenna problem by way of a G4ZU beam, whilst a QSR and mobile receiving gear in the shape of modified Command rx's are other projects on the way. He has been very busy making out reports and has dispatched over 700 to a total of 125 countries. We hope you get 100 per cent. returns Don.

VICTORIA

September Group meeting.—At this meeting 17 members were present. Two new members in Bob Goulet, of North Carlton, and Terry Knight, of Nunawading, were welcomed. Reports received from members indicated the usual great interest in activities. One effort worthy of mention was the fact that one of our blind members, Frank Nolan, heard VK-3ZDG, VK3ALZ, and VK5ZCR on 8 metres using the t.v. rx at home. After general business was dispensed with, we were privileged to receive a talk from George 3WJ on the subject of construction of Amateur medium frequency tx's. George brought along his own well-designed and beautifully made tx as an example and held us spellbound for almost two hours with a most interesting and instructive talk. It was one of the best talks the Group has ever received and for his efforts we wish to thank George most sincerely. We suggest he could write it as a magazine article. (Editor please note and chase him up.)

His talk to us would also be a good rehearsal for a similar talk at a general meeting.

Ken Robertson was among the country s.w.'s represented at the State Convention and played cunning on the Sunday morning to the extent of winning the 2 mxf fox hunt. Don't let those city slickers into the secret of how, Ken. Yours truly, together with Bob Wallace, from Bandiana on the border, set up the recently acquired 122 set and under the guidance of 373S managed quite a few contacts. Queries about the V.s. Group and s.w.'ing in general have been received from Ivan Richardson, of Geelong, and Addison Lowe, of West Heidelberg. Ivan uses an ARS and Addison a 3-valve regen rx. We wish these boys luck in their s.w.'ing and will provide answers to their queries as soon as possible.

QUEENSLAND

Jack Smith, of Welsdon, Brisbane, has dropped us a line and so we now know there are still some s.w.'s in the sunshine State. What's happened to all you chaps anyway? Let's hear more of you from now on. Jack hasn't told us anything about his gear yet, but appears to have a great interest in seeking those rare QSLs.

SOUTH AUSTRALIA

A letter from Bob Simmonds, of Iron Knob, which I had misplaced has now come to light, and so provides news to round off our notes this month and also make the tally four States for the month. Bob and Kev Hill make up the total s.w.I. population of the town. They both have 1155A rx's plus a 3-valve regen, and a Hallcrafters. The impressive list of stations he sends indicates a good location with just a little QRM from the h.t. line from Whyalla. The B.H.P. Co. Ltd. generate the blast furnace in Whyalla, jumps it as 33,000 volts to a sub-station in Iron Knob which then supplies 240v. to the town.

Bob includes a suggestion that the s.w.'s could also get behind the I.T.U. Fund appeal. How about it chaps? I think it's a good idea and have already noticed the names of quite a few associate members in the lists published. You can send your donations to the headquarters of the Division in which you reside for forwarding to Federal Executive.

So with that I must finish these notes for yet another month. Before doing so, I would like to express my sympathy on behalf of all s.w.'s throughout Australia to Maurice Cox, the newly elected Secretary of the VK3 Group. As mentioned in last month's notes, Maurice is unfortunately ill, the illness being polio. We do hope sincerely Maurice that you make a complete recovery and you may rest assured that the best wishes of all s.w.'s are extended to you. We hope that it's not too long before you are back with us at our meetings again as your usual cheery self.

EARLY COPY

The closing date for copy for the January issue is 1st December.

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NOTES

FEDERAL

RETURN OF FEDERAL SECRETARY

The Federal Secretary, Doug. Bowls (3DU) returned to Australia from his overseas tour on Monday, 6th October, 1958.

During his tour abroad, Doug. visited many overseas Amateurs and had discussions with various Radio Societies, such as the R.S.G.B. and A.R.R.L. Doug. also visited Moscow where he was entertained by the Moscow Amateur Radio Society.

Doug. attended the Bad Godsberg Conference as the official W.I.A. representative. More news and details of Doug's overseas tour will be made available when it is handed.

OVERSEAS NOTES

United States: As from the 11th September, 1958, the American Amateurs have lost their 11 metre band. This band has now been allotted for use by medical equipment.

A.R.R.L. has submitted a proposal for the amendment to the existing regulations to extend full operating privileges to maritime operators operating between United States ports. This will allow operation on any band and not restricted as it is now.

During the recent A.R.R.L. DX Contest the authorities conducted a number of power checks on Amateur Stations with the result that a number of well known Amateurs were recorded as using inputs in excess of the allowable 1 k.w.

Several of these Amateurs have had their license cancelled for varying periods of time, and in addition their names have been struck off the DXCC List by A.R.R.L.

Ceylon: Recently news was received that 457 Amateurs have had their licenses cancelled. Since that time a number of unlicensed Amateurs have been abusing the authorities for their activities with the result that the Government has directed that all transmitting equipment is to be seized.

I.G.Y. OBSERVATIONS

"Ghost Signals." Co-operation is being given by Amateurs in the observation of the "ghost signals" previously reported on Russian satellites. This "ghost" signal or antipodal signal appears for about three to four minutes when the satellite is about half way round the world in respect to the observer and the signal again makes its appearance when its position is approximately line of sight.

For those that are interested, they should listen either plus or minus 53 minutes from the time the satellite has made a close pass. Previous indications have been that the signal can be heard at better strength during the evening and has been observed on approximately 50 per cent of the days that the satellites have been in orbit.

Great Britain: R.S.G.B.'s I.G.Y. program of providing reports on propagation conditions has been carried out by some 60 G Amateurs.

The R.S.G.B. received no financial support in this project and the lack of finance limited their programme to some degree, however individual Amateurs co-operated fully and a wide field of observations were covered, some of these being:

Trans aural path propagation of h.f.
Ionospheric propagation on 50 Mc, and the tropospheric propagation in the 70, 144 and 435 Mc. bands.

VALVES FOR INDIA

Queensland: VK4 Amateurs may send their donations of valves to: Box 6381, G.P.O., Brisbane, Qld.

FEDERAL QSL BUREAU

Tom Laidler, VK3TL, hastens to correct an error which appeared in his letter leading to a note in this column in October "A.R." apropos the location of Northern Territory stations. Tom now says, "VK5AE is at Alice Springs, not Darwin. There are five or six listed stations in Darwin, but have no information as to their current activity." Tom expects to be active from Renmark in November.

The two most active Fiji stations nowadays are VR2DA and VR2DG. The former is owned by Pete Alexander (ex-VK2FA), and the latter by Ben Pooley (ex-VETAF2P). Ben works for P. & T. in Suva and states he will be in VR2 for a further two years. Pete intends to a sentence of a further four years. Both stations QSL all contacts and reports. VR2DG uses only 15w, to a long wire on 14 Mc., while VR2DA uses 100w. on both 7 and 14 Mc. bands. Cards through the Bureau "took a tumble" during August and September to the tune of 1000 less each of the months mentioned.

Notes for this column have also declined, chiefly because my chief providore, Eric Trebilcock, BERS196, was so overcome by the surprise and entirely unexpected victory of Colingwood in the Victorian Football League Grand Final recently. It is rumoured that Eric had to receive first aid treatment at the ground and has not yet sufficiently recovered from his shock to enable him to read c.w. with accuracy or to put pen to paper.

—Ray Jones, VK3RJ, Manager.

NEW SOUTH WALES

The Sept. general meeting could have had a "house full" notice outside Science House. For the first time for many years, extra chairs were required to seat the 120 members present. The Secretary read a letter of resignation from the Division's Treasurer, Ced Smith, VK2CD. Ced advised he would no longer be able to carry on this arduous task on Oct. 1. We wish to thank him for the job he has so capably done for the last 12 months when he has instituted new ideas in the financial side of the Division's activity.

Bob Luther has been appointed to fill the post as Treasurer and has been co-opted as a full Council member.

New members continue to join the ranks, bringing the Division's strength to an all-time record of just under 1000.

The President, Piero Healy, read correspondence which had passed between Council and the Dept. of Education. Council has advised the Dept. of Education of facilities available to students. The Dept. was interested in the classes run by the Division, both in lecture form in Sydney and the correspondence course available to persons who are unable to attend the lecture course.

Further business was suspended to allow members to listen to an excellent lecture by Maurice Findlay on "7 Mc. Mobile". Maurice's lecture was well illustrated by slides showing circuits and diagrams of equipment suggested for this increasingly popular form of Amateur activity. A complete mobile installation was displayed, including a centre loaded 9 ft. whip antenna. At the October meeting John 2JU will lecture on stereophonic sound.

HUNTER BRANCH

The 1958 Hunter Branch Annual Dinner and Field Day are now history and the very successful dinner held for the first time since the

hostilities proved that the promulgators were right. So look out for a bigger, brighter and better one next year, chaps. It was purely luck and 52 sat down to an excellent repast after the Rev. Joe 2ANL said Grace. President Lionel 2CS toasted the Queen and welcomed the guests. The latter was responded to by Chris. 2FZ. Alan Fairhall, 2KH, Minister for the Interior and Works, in proposing the toast to Amateur Radio and the Wireless Institute of Australia, gave many insights to contentious matters concerning us and if heeded by all and sundry, it will be better for Amateur Radio. He expressed surprise that since the War our ranks have only increased from some 2,000 to 3,500 and wondered what was the reason. Are we going out of our way to interest the young fry in our hobby of electronic arts (I also dislike the word hobby). In the matter of the I.T.U., Alan is so far the best "arm twister" heard to date, yet even better than Pop. Mac 2OT, representing official W.I.A., responded in his usual manner.

The guest speaker, John 2JU, based his address on "Looking Ahead." No need to say how well John was received despite the fact that he resorted to poetry on a couple of occasions. Among matters he touched on in-

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CONTEST CALENDAR

Compiled by W.I.A. Fed. Contest Com.

"CQ" WORLD-WIDE:

Dates: C.W.—0200 GMT, Nov. 29, to 0200

GMT, Dec. 1.

Bands: All h.f. bands, including 11 mxi.

Rules: See "A.R." Oct., p. 43. (Note Rule

8, Sec. 6 and 7.)

R.S.G.B. TELEPHONE CONTEST

Dates: Nov. 22 and 23.

Bands: Restricted.

Rules: Same as for 1957 except for accor-

d bonus for working G3 stations.

ROSS HULL MEMORIAL V.H.F.:

Dates: 1st Dec., 1958, to 31st Jan., 1959.

Bands: All v.h.f. bands.

Rules: Same as for 1958-57.

Special Award for greatest distance

over 3,000 miles.

NATIONAL FIELD DAY:

Date: Sunday, 25th January, 1959.

Bands: (1) H.F. (2) V.h.f.

Rules: To be published Dec. 1958.

B.E.R.U. C.W.:

Date: Probably January, 1959.

Rules: As for 1958.

OK DX CONTEST:

Date: December, 1958.

Bands: All h.f. bands.

cluded the advance of the transistor power from sunlight reaching interesting possibilities; increasing use of thermocouples to produce power; light amplifiers being the ultimate in t.v.; stereo-sound, etc., etc. That concluded the session and the following are a few observations:

Several speakers praised the efforts of Social Sec. Gordon Sutherland and V.P. Stuart Z2DF for the manner in which they did all the hard work and no doubt their XYLs will be pleased to hear Jim Z2L's socks. Thanks boys for a job well done. ZJU emphasis that we must occupy the bands we have and preserve them for those who follow us and to see that we use the latest techniques. ZKJ's statement that it was due to ZCS that he became an Amateur (just imagine Lionel holding Alan's hand and conducting him around his shack). Did anyone notice Jim Z2L's socks? His wire was received from Roy Parker of VK3 expressing best wishes for the Convention.

The official table was composed of 2KB, 2CS, 2JU, 2AUI, 2OT and 2PZ. Gosford Zone was led by Major 2RU; Blue Mountains by Bob 2ASZ; V.H.F. Group by Jim 2PM, and from far afield came Ben 2ABT and Ken 2XS. Those present included VKs 2AQR, 2ANA, 2PM, 2NLI, 2AWD, 2ZMO, 2ZDF, 2ZDL, 2XS, 2KB, 2OT, 2SF, 2ZL, 2RJ, 2ZK, 2AFA, 2AHA, 2AE, 2XS, 2XQ, 2ZPC, 2AOR, 2RC, 2EB, 2ZAO, 2ASZ, 2FX, 2CW, 2JU, 2ABT, 2ASA, 2AT, 2KQ, 2PZ, 2AUH. Messrs. Sutherland, Adams, Bailey, Davis, Jackson, McLachlan, Jayne, Stuebe, Duvary, Middlederp, Parry, Tooley, Nichol and Connors.

The field day was held on the Sunday but unfortunately I was unable to attend in the afternoon so results will be in your next "A.R." Quite a crowd was present and there was spirited bidding for quite a few articles. Bill Z2L nearly lost his ARS to the highest bidder. The only new face noticed was Muriel 2AIA, who seemed to be enjoying herself making new and old acquaintances.

Due to several circumstances caused by amnesia by those concerned, we did not view the slides sent to us by Wal Z2LILU/3 (VK-2AXH) and a long and arduous bore fruitless. Maybe I have a suspicious mind, but maybe the fact that the lecturer was one of those concerned in the aforementioned disease was purely a coincidence. Anyway, it is not behind us. Seriously though, Lionel did provide food for thought and there is no doubt s.s.b. has its future, but I wish many who use it would make sure it is s.s.b. and not ex-s.s.b. A dummy load is still a good way to test any tx. The usual goodly crowd listened to Lionel and a visitor was Bruce Richter (from Austria, ex-OE1BP). Gordon Sutherland, acting as Secretary, read the minutes. Associate Eddie personally thanked our Branch President, Lionel, for the fine lecture he gave to a father and son night of the OK's at Blackalls. Bill Z2L took 2AQR as his son and the rest of his retinue included associates Max and Bob. Lionel spoke of the early days of Radio and exhibited his four-page licence of 1912. Z2L left his 1912 one at home, but brought his spark tx. Me, I never mentioned I was only a little squirt with a 1929-er. It is lectures like that that sow the seeds of Amateur Radio and helps build up the Institute.

Next meetings chaps is the usual monthly one at Tighes Hill University of Technology at 8 p.m. on Nov. 14, and the usual social at Bill Hall's on 26th. See you.

VKS SOUTH WESTERN ZONE CONVENTION
A very successful South Western Zone Convention was held over the October holiday week-end, when over 100 attended at Canberra.

The Canberra Radio Society, who were hosts to the South Western Zone, are to be congratulated on their fine effort in organising the Convention. Deserving of special mention were Ken Finney, Ted Pearce, John Roberts, Eddie Penkiss, and Les Pitts. There were others but I offer apologies for being unable to remember names. Thank you all for a job well done.

Our thanks go to Mr. Jim Fraser, Member for A.C.T., who officially opened the Convention, also to our Divisional President, Pierce Healy, who made the trip to our Convention to represent Council.

The tour of Canberra was well received by all as was the Amateur Hour and Films on Saturday evening, not forgetting the "beaut-" dinner.

Sunday morning broke very wet, but this did not deter those who went in the scramble, and the 144 Mc. tx. hand. The Disposals auction went very well, all the bits and pieces being sold by auctioneer Ken Finney and his assistant, your scribe. There was some very nice gear on display in the home-brew section.

Sunday evening a Film night was held and supper served.

Results of competitions—Amateur Hour: 1st Jennifer and Barbara Weeden (highland dancing), 2nd Harry James (magician), 3rd Toni Simpson (violin). Scramble: 1st ZRS, 2nd 2AVW, 3rd 2AJO, 144 Mc. Hunt: 1st 2PN, 2nd 2ZAA. Best gear: 1st Eddie Penkiss (s.s.b. rig), 2nd John Roberts (144 Mc. Converter), 3rd D. Evans, Assoc. (G.D.O.). Lady Travelling Longest Distance: Mrs. T. Simpson, from Griffith.—2AJO.

VICTORIA

Quite a large part of the last meeting was given over to the Publications Committee for the purpose of explaining to members the whys and wherefores of our monthly publication. As is to be expected, there is a considerable amount of work involved in producing our mag. and things are fast reaching the stage, so our Editor informed us, and he should know, where our organisation will have to sport itself a full-time Editor to co-ordinate

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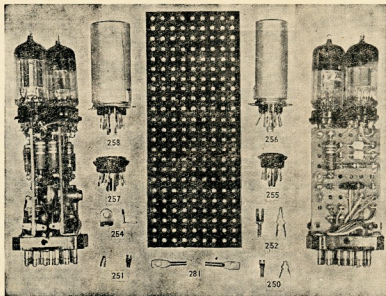
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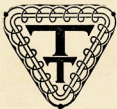


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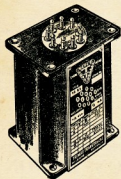
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the morning a two metre fox hunt was held and this was won by Maurice 3MS. Ken Robertson, from Pt. Albert, won the 2 m tx hunt and the 2 m rx hunt. The 2 m rx hunt was won by a new event held in VK3 for the first time was the blindfold tx hunt on 288 Mc. This was won by 3DQ's XYL, Mrs. Donoghue. (You have a chance, John, after this shush-like effort.) For the young, sweets were distributed and one might say that it was obvious from the foregoing that this year's State Convention was a huge success.

To the organisers we say thank you, particularly to our Secretary, Jay 3JL, and our President, Fred 3YS. But we say thanks also to the members who supported us so wholeheartedly, and to the members who came with their XYLs and YLs from far and wide. It was good to see you in the city. They tell me that at one stage in the park on Sunday afternoon there were 38 cars with loops, antennae, etc. Perhaps this will be a forerunner of yet another Convention in Melbourne at a later date.

MIDLANDS ZONE

It is pleasing to note that the "regulars" are still attending the hook-ups on the second and fourth Tuesdays in each month, although for the last two your correspondent has been forced to keep a close watch on the rebuilding of the tx, modulator and t.v.i. During a recent hook-up we had another listener, Tom Biggs, of Raywood, who has passed his 40th birthday licence. One stalwart supporter of hook-ups has now departed, but with our best wishes for his future occupation. The 30th who has resigned from School Teaching to enter a electronics division of an overseas manufacturer, who has sent him on a world tour, commencing in the 1950s through Europe, East and other interesting parts dear to the heart of a DX man.

What the member of the Zone is also going on a world tour next year in connection with his occupation as City Engineer of Bendigo—Rex 3UR, who will be going on a tour very similar to Peters', and will doubtless find time to meet some of the friends he has made overseas. Rex is an extremely capable man in his chosen profession, and will doubtless make the most of the trip from this angle and from his hobby, which rather gets the short end of the stick these days in the process of work.

3EL has been active on 2 m tx and rx and hopes to get to 40 m tx soon for the forthrightly chatter. My spies advise that Maldon has the highest density of t.v.s. per head of population in the country. The Secretary will doubtless be the reason for the lack of suitable signals from Maldon.

MOORABBIN AND DISTRICT RADIO CLUB

At the last club meeting members heard the tape recording by Commander Batherman on Navy grounds, kindly lent by Len 3YB. All agreed that this was one of the best talks they have ever heard, and voted for more of the same.

Activity on 40 and 80 m has continued at a good rate and those non-members who are interested should seize the opportunity to increase their number of contacts for the Honorary Certificate of Membership. Don't forget to ask all your VKJ contacts: "Are you a member of the Moorabbin and District Radio Club?"

Meetings are continuing on the third Friday of each month by courtesy of 3EM at 287 Jasper Road, McKinnon.

QUEENSLAND

At the Council meeting held as usual at the Y.M.C.A. rooms in Edward St., members approved the purchase of parts for the six v.h.f. "Communicators" being constructed by selected members of the v.h.f. society. These units, it is anticipated, will be used in future emergency runs and will provide a workable basis for a stockpile of suitable v.h.f. emergency gear for the Queensland Division. Provision is also to be made for v.h.f. operation at 4W1 which, with the added improvements put in by Bert 4AO, will then permit operation on five separate channels.

Some spare work was put in by Alan 4ZAE and Ron Carrel 4ZB, and out as the result of a letter about the Old Observatory in Wickham Terrace. As most Hams know, this building was once used by Tom 4CM and the late Dr. McDowall, and is now being used as a City Council building. In considering its past radio history, its location and its value as a well known landmark, the boys thought that it would be a fitting city hq. where at least Council meetings could be held. This proposition was put to a Council meeting where it was favourably received and an approach is now to be made by our President, John 4FP, to the City Council regarding the acquisition of the Old Observatory. No results are to hand yet.

The Xmas Party is being organised and is scheduled for the second Saturday of December. Keep the date in mind and watch "QTC" for details. The last party was down a bit in attendance figures so this year give it your support and come along. A good time is assured.

All cards to be handled by the Outward QSL Bureau may be sent to D. B. Hughes, C/o. P.O. Clontarf Beach, Clontarf. A rapid service is assured.

The general meeting at the State Service rooms in Elizabeth Street saw a good roll up of members to hear Everett 4XL give a very informative lecture on "Mass Production of TV and Electronic Equipment." The processes involved were "eye openers" and the boys thoroughly enjoyed the evening. A vote of thanks was passed to Everett by the President. The chairman of the V.h.f. Society, Bruce 4ZBD, reported that queries had been called for quite a number of items required in the construction of the Communicators. At present there is some little delay about seeing the necessary 84 Mc. crystals. The next v.h.f. meeting will be held at John's (4FR) QTH where these units will be constructed. All interested are cordially invited to attend every third Friday night at 8 p.m. at 4JO's shack.

Bruce 4ZBD put forward proposals regarding the use of c.w. on 30, 11 and 10 metres by L.A.O.C.P. holders. Jim 4OB then moved that c.w. be permitted on 30, 11, 10, 6 and 3 m, with m.c.w. on 6 and 2 m. This, to be allowed, if the applicant has passed a five word per minute test on 30 m.

It was noted that some items of correspondence addressed to F.E. were not acknowledged and correspondingly an agenda item was formed as follows:

"All outstanding correspondence addressed to F.E. be supplied with progress reports as to what action is even being taken."

The last 2 m hidden tx hunt was again won by John 4FP who, assisted by his usual navigator, found the tx just off the Old Clevebank Road in the bush at the end of Promenade Road. Rick 4VR had the car neatly hidden, having cunningly parked his car with covering beside a parked caravan. Quite deceptive—how nice that!

TOWNSVILLE

How is that to many chaps can forget the last Thursday night in the month, which is the meeting date of the club? At the last meeting there was only a few of the stalwarts present. The Secretary renewed his apologies in advance for the next two meetings because of shift work.

John 4DD has now his voice back and punishing the 10 m band calling CQ. The 4EJ has most had two thumbs on the one hand due to an accident at work when he split the member on the gullotine. Glad to hear it is healing well and does not impair his DX activities on 10. Bob 4ZAY and two others going up for the morse this time; hope they are successful.

Len 4GD and Eric 4EL get in cahoots on the band and try to outcall each other for DX on 10 m.

Graham 4DX is a show-off of his former self, just shows what hard work and plenty of travelling will do in chasing the line noises in the various towns. Come out my way sometime and really hear what the noise level rises to. The Z boys are really getting into their stride for this summer openings on 50 m. The 4EJ expects to head the night. So the QSL Bureau will be overworked this summer with cards.

Edmond 4GZ does not now suffer from QRM since VLF has been on QTH. Owen 4OV, at Mt. Isa, heard making sleds for the boys passing Mt. Isa with their mobile gear. Latest to pass through being Eddie 5OW from Darwin, while Joe 4AB soon expects to leave for D.C.A. Longreach and will have to do some rebuilding and give present gear back to rightful owners, cannot take the gear so far away, he said.

4W1 broadcast on 14 Mc. a failure the last few Sundays, even 8W1 only just audible. What is this jealousy in the islands, Frank? Could not hear the full 2W1 broadcast.

MARBOROUGH

4DJ getting a prop. pitch motor to turn his two quads has been on d.s.b. on 40 m, now building a 50 Mc. converter for the summer season. 4CB contemplating a huge tri-band beam with vertical elements, a la "GSP" Arch is tuning up his 66 ft. wire on all DX bands and getting results. 4AI heard on 21 Mc. c.w. Alan hasn't dismantled his new rig yet, so some 4W1 may also be in the place.

4BG changed mods. to AB2 and no longer under-modulating. Getting back on to DX cards after a break. 4BJ, of Bundaberg, had bad luck to lose his car smash-up just after leaving here on way home. Vic. suffered a broken left big toe, so looks like he'll be a while. 4BX and 4HZ, of Gympie, also paid flying visits lately.


— . . . —

SOUTH AUSTRALIA

Last meeting heard Laurie Phillips, 52U, a technical officer of the E.T.S.A., give a large assembly of members, intending members and visitors a most informative lecture on Communications on High Tension Power Lines, in particular just how this was done over the network linking Port Augusta with control in Adelaide.

As the basic techniques embody similar principles to some we use each day from our car, the presentation of the interest was. Although some listeners were perhaps a bit disappointed when they saw the size (and not really calculated in the weight) of the so-called coupling condensers, which would preclude Ham experimentation of such a system.

As Laurie explained, the need for a system like this was established when the Port Augusta Station output became an appreciable component of the State's generating capacity, so



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the need to effectively control the co-ordination between the, and Osborne, as well as the lines between them, became of major importance.

Normal voice control is achieved by direct connection of the two points, together with "party lines" to sub-stations, telemetering for the central control, remote switch operation for control of sub-stations, remote location and alarm, are just some of the things this complex system provides.

It is all done by using the metal conductors as a transmission line, and all at voice frequencies on a single sideband, suppressed carrier method of signalling.

Some of the larks used to make one crystal provide unpleasant simultaneous frequencies gave us a few ideas, for that same crystal was controlling both transmission and providing a means of control in reception.

Transmission line theory came in for its share of eyebrow lifting too, for if any of you have worked on these things you will know that a certain gauge wire at such and such spacing, will give an impedance of so and so, provided it is held firmly and with immovable spacers to do just that, whereas in this high tension line business, the lines are not so controlled, have also to be transposed every now and then, and, in the end, the whole system in the breeze. The problems attached to this alone presented quite a few headaches to the designers.

Some excellent diagrams illustrated the lecture, these being shown on the screen by Gordon using an epi-dio-epi-cycl-oh-bang, and some, including one of the hard worked (defunct) crystals. A tape recording of some conversations over the network and the signals used for control were heard to complete the picture.

John J.C. who moved the vote of thanks, expressed everyone's appreciation of the informative address and thanked Maurice for the work he put into its preparation.

After smoko and QSL distribution by Norm and Jim, we reverted to normal business which included the acceptance of the following new members: C. Appelly, GZBB; B. H. Hill, SW2; D. G. Kates, G. J. Klipper, G. Geue, B. G. Dales, G. J. Klipper, G. Geue. Welcome to the fold fellows, pleased to have you with us.

Following a business discussion the deferred action from the previous meeting re the Sub-Division Subscription to I.T.C. was put to the meeting and a sub of £25 from funds was authorised for the purpose. John J.C. had but one letter to read out, with Federal Councillor Rex left to do most of the talking.

Two more letters were read, one received and operated in Northern Territory for some time submitted their ideas re asking for VK8 for that area and it was decided to try the idea. The other was a letter which would be done.

Gordon SXU spoke of the need to watch operation and have nothing to do with pirates, there being a big example recently which came before the notice of the Advisory Committee.

Reference was also made to the need for suppression of harmonics and advising anyone in doubt or in trouble to contact the technical committee who, under Ray 5BT (phone LF 5725) was in a position to help, and indeed was.

At the conclusion of the meeting your scribe was "invited" to take Doc home (he was soft for once—too wet to bring that nice shiny baggy pants and a pair of shoes). The three other navigators from Gawler and set sail for the Big House. This entailed going down to the main street, turning right, and finding up going via Henley (or nearly so). The rude remarks of the four navigators and what they would have done are not to be held responsible for, as we are not on TV. We leave it to you from there.

Tom TSL has devised a new way of getting his Nalvasee, and a new home. QSLing him is a pleasure. He resembles a schoolboy, and can thus travel on a special bus dropping him off at the door. An apple each day for the teacher will help. Argumentative blarney is not heard him dispute with Gordon SXU the Hebride or Gaelic Ancestry of a member who was querying a false statement or over. The language is of pure interest again, and in breast of John 5FB, kept at him Lance and he will thaw out and resume activity on the air. The language is of pure interest again, recently, very nice too, watch out Keith they will keep you up all night on that band.

Jack SAM working on a new triband cubical quad, and words of thanks and appreciation correct size and spacing and all on 18 inch

boom. You must do an article on that Jack, for it is a winner and answers most of the questions. You said it wasn't original, but don't let that stop you. It's a winner.

Joe 5JO still in hospital and general condition causing some concern. He will have to get quietly for quite a while.

Wally 5BP has put the key away again since the new modulator came good and is now back to normal. Keith 5MT, temporarily at least, is confined to bed but has a good recovery. A temporary period following change in QTH and some travel.

WESTERN AUSTRALIA

After the usual business had been disposed of at the last monthly meeting, GRM and 6KW took the floor to deliver lectures. Ron showed how simple addition to the modulator will allow a high level of modulation to be run without danger of splatter causing interference to other stations. Rolf told of the fun and games he had in running stable operation of his 6146s on 28 Mc. He described the circuit he is now using to neutralise his final. This consists of a bridge circuit, which can be adapted to any other tube.

Sunday, 21st Sept, Wally and Mrs. Coxon entertained Council members at their home in Darlington. The weather was generally unpleasantly warm around Xmas time, Wally and his XYL decided that a much more pleasant day should be about the 21st of the year. We are indebted to Wally and Mrs. Coxon for a most enjoyable time.

The monthly meeting of the 28th of September, of participants this year, there being 50 stations on the air; this included one which was not worked by anyone to my knowledge. It sounded as if this particular station was keying a g.d.o. I couldn't get the call sign anyway; there was too much frequency shift. Sorry fellers! Winners were GRM (ch), 6TR, 6KW and 6KJ/P (portable station). I decided to come on at the last moment and thus cause some snappy operating on the part of all stations. However, the operating was so good that all stations on the air at the time, with one exception, were worked apparently. That particular station was the station I was supposed to be coming on for the last 10 minutes only next year have been scrapped after listening to a detailed description of the sticky end which awaits anyone who carries out this plan!

Found 6B0 feverishly wielding a paint roller in his lounge room the other day. Rolo appears to be equally at home with paint brush as with stick of chalk. Believe some more building operations are scheduled to start soon.

6TR and 6KW were busy around the 6B0 6BR8 mixers and sideband filters, so expect he is going to give a.s.b. a try, as he has been threatening to do for some time. 6CA has made it to 80 Mc. and is now 80 Mc. No to see you on the band. Kerry. 6DW has been transferred to Perth and is taking up residence in James St., Busselton. Three of em in one street! Believe super town now boasts at least six call signs, and active ones at that. Much feverish activity among several of our Z boys with more wordy work on the part that some will be applying for the full ticket in the near future.

Chuck 5BP has his receiving set-up working and is expected back on the air. Chuck is another who has been busy house-building, and has had no time for Ham Radio.

Would you mind reminding the State is lagging in I.T.U.C. contributions. The time is fast approaching when the delegate will be leaving. News from overseas, even from the U.S.A., are proposed changes in the regulations is most disturbing. The Ws have already lost exclusive use of v.h.f. bands 220 up. No matter whether your interest is in DX, radio news around your own State, or in experimenting on v.h.f., it is essential that you make your presence felt at the approaching convention in 1964, and so on. Incidentally, if your contribution has not been acknowledged through this magazine, don't be worried. Some delay in forwarding cards from our I.T.U.C. co-ordinator to I.T.C. is unavoidable.

TASMANIA

NORTH WESTERN ZONE

Our usual bi-monthly meeting was held last month with really a good number of members. Three visitors were welcomed with hopeful invitations to become members. Our zone strength is growing rapidly.

General business was rapidly disposed of, followed by the regretted resignation of our President, Ted T2F. Ted is moving to Hobart and words of thanks and appreciation for all he has done in the Zone were spoken by

several members. He was also wished the best of everything by all. Lee 7KC was elected to fill the vacancy—best of luck, Lee.

Donations to the I.T.U. Fund were again "plugged" by the Secretary and President. I trust the desired results will be forthcoming. Stations were directed forward to continue instruction for Associates and it was decided to hold meetings in alternate months for such purposes. An activities committee was appointed to arrange for the display of members' equipment with suitable orientations on their expectations.

It is decided to have a "live" exhibit in the Burnie Chamber of Commerce Hobbsie Week Exhibition. Burnie members have it all under control.

Some of us associates sat for the A.O.C.F. examination last month and are still anxiously awaiting results. Keep your fingers crossed for us!

Some of our YLs and XYLs waited on us once more with supper and their labors were much appreciated. Also I think they enjoyed the fun of the auction which followed. Ted did a really first class job for his last run (another auctioneer will have to be found) and Sam Jones showed a further gain.

Sam 5RS reported that he now has only one more State to "get" for his W.A.S. Certificate. Sort of the last straw, eh, Sam? Peter TFF, who I believe is doing a spot of QTH jumping, hopes to be on the air soon on 2 m and also on the lower bands. He had a 2 m converter and tunable I.F. at the meeting. The converter looked the goods on a baking dish for Christmas.

Listening on the various bands indicates that Spring has brought a lot of members out of the "hibernation" zone. You shouldn't be any trouble getting contacts now.

ADVERTISEMENTS

1/- per line, minimum 3/-.

Advertisements under this heading will only be accepted from Institute Members who desire to dispose of equipment which is their own personal property. Copy must be received by 8th of the month, and remittance must accompany advertisement. Calculator. 10 characters on an average of six words a line. Dealers' advertisements not accepted in this column.

FOR SALE: AT5 Genemotor 12v. input, 550v. and 250v. output, £6. Command Transmitter with tubes, 100 mos. 6TR, 6MC, £5. AR8 Receiver, 140 Kc., to 20 Mc., converted 230v., 6V6 output, £25 or offer. W. Kerr, 17 Jasper Street, Noble Park, Vic.

FOR SALE: I.f. and Audio Unit: 6C4 co-ax input to 1600 Kc., 12SK7 1600 Kc. I.f., 6SA7 mixer, 12SK7 455 Kc. I.f., 6SQ7 det-audio, 6V6 output, 12SK7 b.f.o., 5Y3GT and OA2, £8/10/0. Tuning Unit to suit above: 12SG7 I.f., 6AC1 mixer, 6C8 osc., plug-in, bandpass coils for 30, 40, 45, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, 300, 310, 320, 330, 340, 350, 360, 370, 380, 390, 400, 410, 420, 430, 440, 450, 460, 470, 480, 490, 500, 510, 520, 530, 540, 550, 560, 570, 580, 590, 600, 610, 620, 630, 640, 650, 660, 670, 680, 690, 700, 710, 720, 730, 740, 750, 760, 770, 780, 790, 800, 810, 820, 830, 840, 850, 860, 870, 880, 890, 900, 910, 920, 930, 940, 950, 960, 970, 980, 990, 1000, 1010, 1020, 1030, 1040, 1050, 1060, 1070, 1080, 1090, 1100, 1110, 1120, 1130, 1140, 1150, 1160, 1170, 1180, 1190, 1200, 1210, 1220, 1230, 1240, 1250, 1260, 1270, 1280, 1290, 1300, 1310, 1320, 1330, 1340, 1350, 1360, 1370, 1380, 1390, 1400, 1410, 1420, 1430, 1440, 1450, 1460, 1470, 1480, 1490, 1500, 1510, 1520, 1530, 1540, 1550, 1560, 1570, 1580, 1590, 1600, 1610, 1620, 1630, 1640, 1650, 1660, 1670, 1680, 1690, 1700, 1710, 1720, 1730, 1740, 1750, 1760, 1770, 1780, 1790, 1800, 1810, 1820, 1830, 1840, 1850, 1860, 1870, 1880, 1890, 1900, 1910, 1920, 1930, 1940, 1950, 1960, 1970, 1980, 1990, 2000, 2010, 2020, 2030, 2040, 2050, 2060, 2070, 2080, 2090, 2100, 2110, 2120, 2130, 2140, 2150, 2160, 2170, 2180, 2190, 2200, 2210, 2220, 2230, 2240, 2250, 2260, 2270, 2280, 2290, 2300, 2310, 2320, 2330, 2340, 2350, 2360, 2370, 2380, 2390, 2400, 2410, 2420, 2430, 2440, 2450, 2460, 2470, 2480, 2490, 2500, 2510, 2520, 2530, 2540, 2550, 2560, 2570, 2580, 2590, 2600, 2610, 2620, 2630, 2640, 2650, 2660, 2670, 2680, 2690, 2700, 2710, 2720, 2730, 2740, 2750, 2760, 2770, 2780, 2790, 2800, 2810, 2820, 2830, 2840, 2850, 2860, 2870, 2880, 2890, 2900, 2910, 2920, 2930, 2940, 2950, 2960, 2970, 2980, 2990, 3000, 3010, 3020, 3030, 3040, 3050, 3060, 3070, 3080, 3090, 3100, 3110, 3120, 3130, 3140, 3150, 3160, 3170, 3180, 3190, 3200, 3210, 3220, 3230, 3240, 3250, 3260, 3270, 3280, 3290, 3300, 3310, 3320, 3330, 3340, 3350, 3360, 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8350, 8360, 8370, 8380, 8390, 8400, 8410, 8420, 8430, 8440, 8450, 8460, 8470, 8480, 8490, 8500, 8510, 8520, 8530, 8540, 8550, 8560, 8570, 8580, 8590, 8600, 8610, 8620, 8630, 8640, 8650, 8660, 8670, 8680, 8690, 8700, 8710, 8720, 8730, 8740, 8750, 8760, 8770, 8780, 8790, 8800, 8810, 8820, 8830, 8840, 8850, 8860, 8870, 8880, 8890, 8900, 8910, 8920, 8930, 8940, 8950, 8960, 8970, 8980, 8990, 9000, 9010, 9020, 9030, 9040, 9050, 9060, 9070, 9080, 9090, 9100, 9110, 9120, 9130, 9140, 9150, 9160, 9170, 9180, 9190, 9200, 9210, 9220, 9230, 9240, 9250, 9260, 9270, 9280, 9290, 9300, 9310, 9320, 9330, 9340, 9350, 9360, 9370, 9380, 9390, 9400, 9410, 9420, 9430, 9440, 9450, 9460, 9470, 9480, 9490, 9500, 9510, 9520, 9530, 9540, 9550, 9560, 9570, 9580, 9590, 9600, 9610, 9620, 9630, 9640, 9650, 9660, 9670, 9680, 9690, 9700, 9710, 9720, 9730, 9740, 9750, 9760, 9770, 9780, 9790, 9800, 9810, 9820, 9830, 9840, 9850, 9860, 9870, 9880, 9890, 9900, 9910, 9920, 9930, 9940, 9950, 9960, 9970, 9980, 9990, 10000.

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| 0.01,600 | 1/3 | 0.47,400 | 3/5 |
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 1 1/2, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

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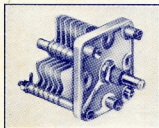
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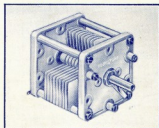
2" END-PLATE



Cat. No. 815

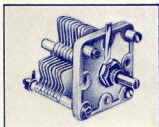
Cat. No.	Type	Capacitance (pF.)		Proof Voltage	Air Gap (ins.)
		Min.	Max.		
815	Single Section	7.5	67	1,700	0.048
816	Single Section	9	190	1,000	0.024
817	Single Section	11	270	1,100	0.024
818	Butterfly	6.5	31 per section	1,700	0.048

2½" END-PLATES

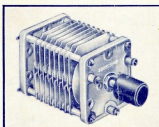


Cat. No. 835

Cat. No.	Type	Capacitance (pF.)		Proof Voltage	Air Gap (ins.)
		Min.	Max.		
831	Split-Stator	9	28	2,500 per sect.	0.080
832	Split-Stator	9	51	2,500 per sect.	0.080
833	Split-Stator	18	97.4	2,500 per sect.	0.080
834	Differential	8.9	73	2,500 per sect.	0.080
835	Single Section	17.6	237.3	1,250	0.040
836	Single Section	13.6	112	2,500	0.080
837	Butterfly	13.5	53	2,400	0.080
839	Single Section	28	390	1,250	0.040



Cat. No. 816



Cat. No. 836

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